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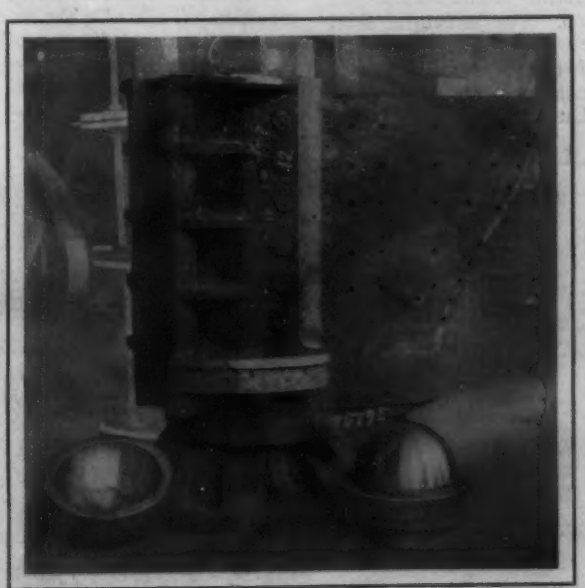
Gate Mechanisms of the Panama Canal Locks

The Mechanical Principles Employed and the Titanic Size and Difficult Foundry and Machine Shop Products Required

The gates required to control the locks of the Panama Canal have developed problems in mechanical engineering, including operations in the foundry and machine shop, of large proportions not to be overlooked because of the overshadowing influence of and the all-absorbing publicity given to the civil engineering work. Few apprehend the total number of the gates required for the three locks of the Canal system, though it was to be expected that the individual parts of the gates and their mechanism would be of gigantic size, nor is it generally known what interesting mechanical systems have been evolved for handling the large masses and meeting the heavy pressures encountered. What is to follow covers largely the work done and now in process of construction by the Wheeling Mold & Foundry Company, Wheeling W. Va., the total of the contracts of which will amount to 19,000 tons, comprised in iron and steel castings and in 334 machines for operating the gates and valves, in conductor rails for supplying current to the electric locomotives which will tow vessels through the Canal on a cogged way, some 40,000 lb. of manganese bronze and in rolled nickel-steel yoke pins, wedges and the like and a pumping system covering 350,000 lb. of piping, valves, etc.

There are locks at three locations on the Panama Canal. The most important are those at Gatun, where there are three lifts. The others are at Pedro Miguel, with one lift, and at Miraflores, where there are two lifts. There are two waterways to each lock and the entrance and exit to each lock and the different chambers in each lock are protected by double swing or mitering gates which swing like doors from hinged joints, so to speak, in pairs, mitering together in the centre of the channel and forming an angle pointing against the pressure of the water. Each door is known as a leaf and each leaf is about 65 ft. wide. Each pair forms the gate proper across the lock channel or waterway, which is 110 ft. wide.

The lock structures, which are of concrete, are provided with subterranean culverts or conduits into which the water from the higher level is admitted, and from which the water passes through lateral channels into the bottom of each chamber of the lock. Similarly there are separate openings from the bottom of the lock chambers through which water, on discharging a lock, passes into a separate set of lateral conduits which deliver into the main drainage waterways discharging to the lower level. So-called rising-stem valves are provided to command the main conduits for controlling the water flow from high level and to low level, and cylindrical valves are employed to admit the water into the lateral supply conduits to each chamber of the lock. The valves for all of the locks are driven by electric motors installed at each valve and a system of motor control has been developed for commanding these valves at relatively distant points.



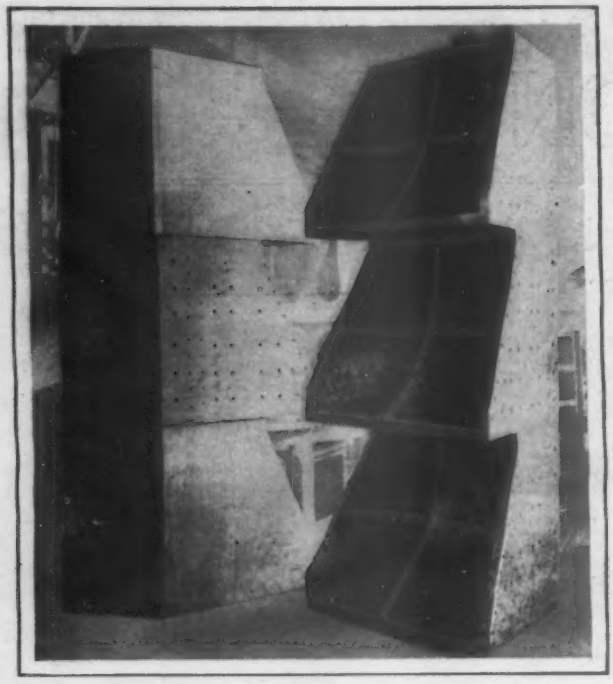
THE HINGES FOR EACH LEAF OF THE LOCK GATES

The Upper Picture Shows a Group of the Yokes, One for Each Leaf is Anchored at the Upper Part of the Masonry and Receives a Pin Fixed to the Top of the Gate, Thus Forming the Upper Hinge

The Lower Picture Shows the Assembly of the Pivot or Lower Hinge to the Gate Leaf. The Group Includes the Upper and Lower Pintle Castings, One So-called Reaction Casting and the Heel Casting Forming the Lower Corner of the Gate; It Also Shows in the Foreground the Pintle and Bushing

Features of the Lock Gates

An idea of the magnitude of the work may be gained from the fact that each of the two channels through the Gatun locks required 10 gates or 20 leaves, 40 leaves all told. Thirty-two of these are 77 ft. in height and half of the remainder 64 ft. 8 in and the other half 47 ft. 4 in. For the locks at the three locations, a total of 92 leaves was required, this meaning that besides the leaves themselves, a heel casting had to be provided for each leaf; a group of castings was required mounted one above the other to form the two vertical edges of each leaf, known as the quoin end and miter end reaction castings; a pintle bearing with its various parts had to be provided for each leaf; a yoke at the top anchored into the lock masonry with a hole for a



Group of Heel Castings, Each Machined on Five Faces and Having 316 Drilled Holes and Weighing 6000 lb.

large pin fitted into the top of the leaf was necessary for the upper hinge joint; and arrangement for swinging each leaf in and out of the closed position had to be designed.

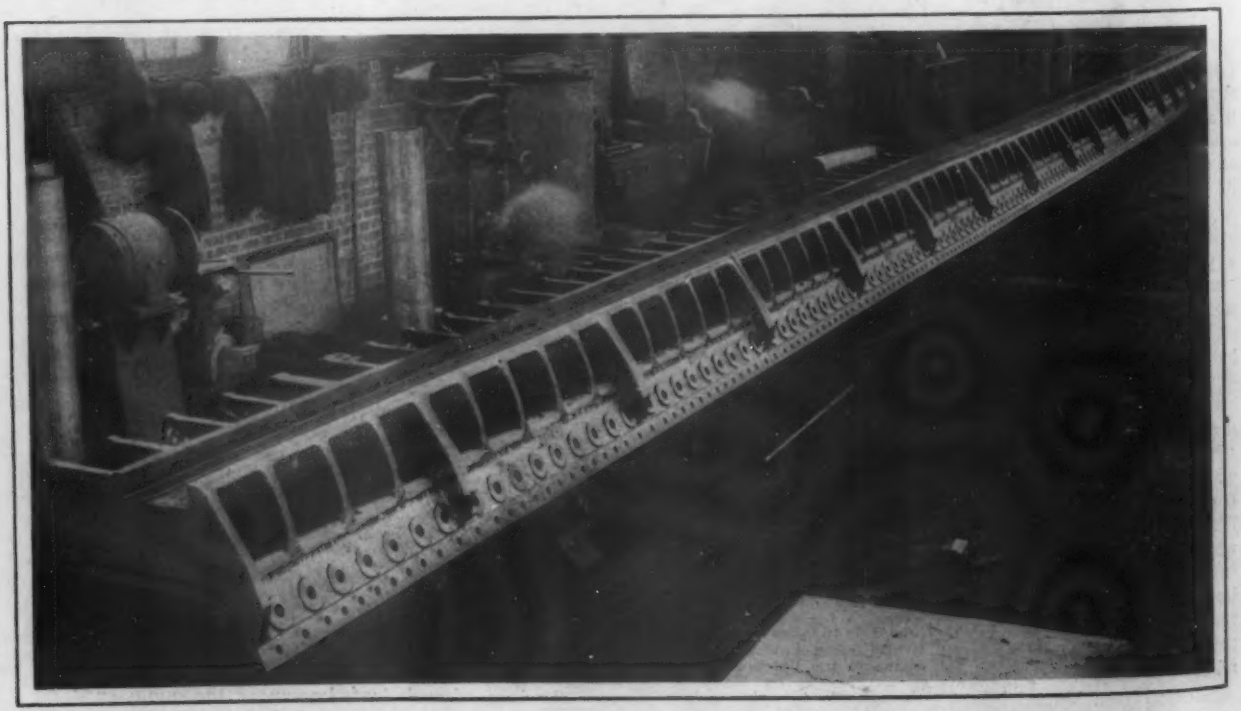
Each leaf is substantially an air-tight chamber constructed of structural shapes covered with steel plates which form the air-tight chamber. The vertical edges, as already stated, are made up of the quoin end and miter end reaction castings. The typical leaf is 7 ft. in thickness, except toward the edges where the thickness is brought down to meet the reaction castings.

The general contract for all of the gates was placed with the McClintic-Marshall Construction Company, for which the Wheeling Mold & Foundry Company supplied the cast portions and the pintle and yoke bearings, as well as manhole frames and covers giving admittance to the chamber of the leaf from the top. The structural steel was rolled mainly at the mills of the Jones & Laughlin Steel Company, though some of the wider plates were made by the Carnegie Steel Company, at the Homestead Works. It has been estimated that if all the gate leaves in the Canal were to be piled on top of one another they would make a tower more than 1¼ miles high. The weight of the heaviest gate leaf is 1,483,700 lb., and the total amount of material covered by the McClintic-Marshall contract is 118,488,100 lb.

One of the most important of the castings in connection with the gates is the yoke, on which, as stated, each leaf swings at the top. This is made of vanadium steel and weighs 6500 lb. including the bronze bushing which takes the pin in the top of the leaf. The upper of the two views on page 1197 shows a group of the yoke castings. On account of the importance of the yoke, it was considered desirable to test one of them to destruction, which was done in April, 1911, at the Ambridge, Pa., plant of the American Bridge Company. Fracture took place when the stress required to break the yoke was about 3,300,000 lb. or about seven times the greatest load that can come upon the yoke even when the gate is swung free in the dry. The specifications required 0.16 per cent. vanadium, and test specimens indicated an elastic limit of over 40,000 lb. per sq. in.; ultimate strength of 70,000 lb., and an elongation of 24 per cent. in 2 in.

The lower of the two views on page 1197 shows the upper and lower pintle castings in place, and also the heel casting of the leaf and one reaction casting. Incidentally, in the foreground may be seen the pintle and its bushing. A group of the heel castings is shown on this page These are of 0.30 per cent. carbon steel, and each weighs 6000 lb. Each casting requires machining on five faces, and has 316 drilled holes. It is designed to transfer the entire weight of the structural steel leaf to the pintle bearing. The two parts of this bearing are of vanadium steel, and the upper casting has a manganese bronze bushing which fits the nickel-steel forged pintle. Of the twelve gates reached by tidewater, the bushing was made of vanadium steel instead of manganese bronze on account of the danger of electrolytic action.

The lower cut on this page shows a line of quoin end reaction castings on the erecting rig for fitting preparatory to shipment. These are castings for the edge of one of the shorter leaves. The weight of these castings per leaf averages 87,000 lb. The illustration on page 1203 is given to show the double headed planing machine built especially for finishing these castings, the bottom surface being cut while the planing machine table is moving in one direction and two side cuts being taken in the reverse direction. To handle the work to advantage, it was necessary to prepare quite a number of jigs, and also rigs for erecting and testing the castings. Generally a line of the castings were assembled on a rig before being placed on the planing machine.



A Line of Quoin End Reaction Castings on Erecting Rig for Fitting Preparatory to Shipment, Such a Line Forming a Vertical Edge of a Gate, One Edge at the Lock Wall and the Other Mitering with the Edge of a Corresponding Leaf in Center of Channel

How the Lock Gates Are Operated

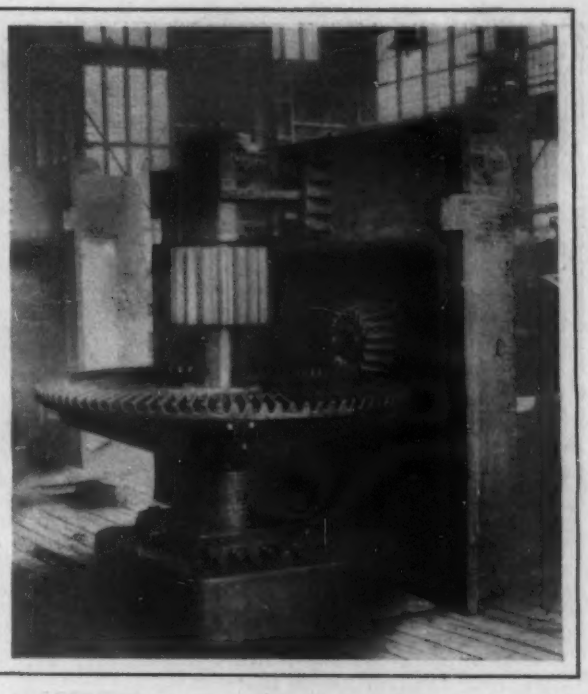
The mechanism for operating the gates is one of the most interesting features of the mechanical engineering work of the Panama Canal. It was realized that the gate leaves are of so great size that more than usual care would have to be exercised to regulate the force applied to the leaf in a manner approximately proportional to the resistance to its motion. The resistance is greatest when the leaf is near the two extremes of its path, that is, when near the mitered position or in the position of rest in a recess provided in the masonry side of the lock chamber. Views of the machinery are given on pages 1199 and 1200.

The motion is imparted to the leaf by a horizontal strut connected by a vertical pin to the upper girder of the gate leaf. The other end of the strut is fitted to a pin forming part and near the circumference of a large horizontal gear wheel. The gear wheel is caused to turn by a pinion revolving on a vertical axis, this in turn actuated by a motor located in an adjoining chamber in the lock masonry. A study of the plan drawing will show how the machine is capable of exerting its greatest force at the time when the resistance is greatest, and it is emphasized that the rate of increase of the force from minimum to maximum is greater than the rate of increase of the resistance. The type of machine was designed and has been patented by Edward Schildhauer, electrical and mechanical engineer of the Isthmian Canal Commission, and the contract for the 92 complete machines required was taken directly by the Wheeling Mold & Foundry Company.

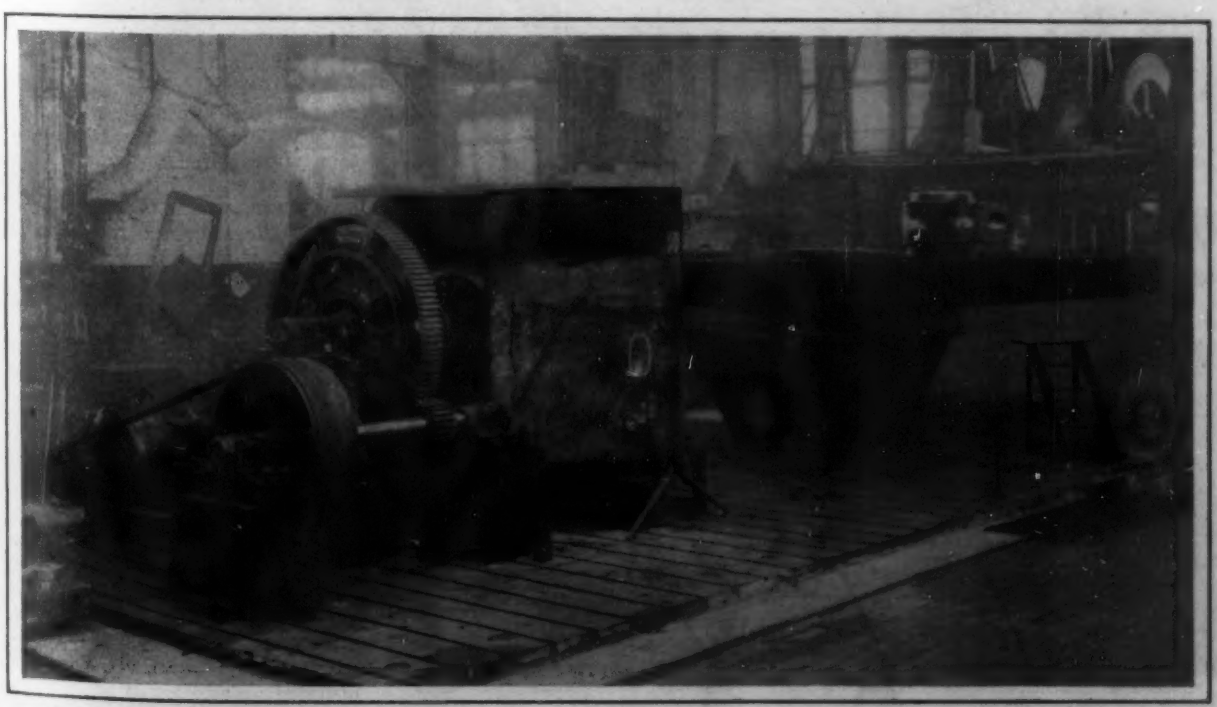
Unlike the valve operating and other machinery installed for operation at the Panama Canal, the bull wheel, as the large gear is called, and the strut arm will be in plain view from passing vessels, and their operation can be closely observed while the vessels are stationary in the locks, waiting to be raised or lowered according to the direction in which they are bound. As the machines must necessarily be above high-water level, and as there could be no obstruction to the passage of the electric towing locomotives, which will tow vessels through the locks, the machines were placed in a recess in the top of the lock wall, as shown in the sectional elevation on page 1200, with the track for the locomotives carried over this recess by means of a bridge of steel beams and concrete. The gate in the open position fits into a recess made for it so that the front face may lie flush with the lock wall.

Among the problems encountered in applying the principle of the moving machine was the necessity of providing against sudden shocks, which might damage the machinery and perhaps put the gates temporarily out of commission. At two points springs are provided in each machine for absorbing shock. One of these is in one of the gear wheels between the motor and the bull wheel, this being necessary to adjust the stresses of starting and stopping the motor and any fluctuation of speed. The other spring is located at the outer end of the strut arm and this is very powerful. It is to provide against sudden stress due to the inertia of the gate when stopping and starting and also should there be an obstruction to the movement of the gate on account of floating material getting between it and the wall of the lock. The strut arm is of structural steel for the most part, the ends for connecting to the gate and to the bull wheel being castings. The arm is hinged so that it can be disconnected from either the gate leaf or the bull wheel and moved out of the way if necessary to make repairs. The buffer spring consists of six small and six large helical springs and the strut arm complete weighs 7700 lb. and is 26½ ft. long over all and 16 in. x 3 ft. in its greatest lateral dimensions.

One of the views on page 1204 shows a bull wheel in process of machining. It is cast in halves on account of its size and to facilitate transportation and assembling, the method of molding and the rough casting being also



Semi-Steel Bulkhead Protecting Motor Chamber and Part of the Gearing for Operating a Gate Leaf



Assembly of Gate Operating Mechanism at the Works, Showing How the Motor Drives Through a Special Spring Contained Gear, also the Bulkhead and the Large Horizontal Gear to Which is Attached the Strut Joined to the Gate Like a Connecting Rod

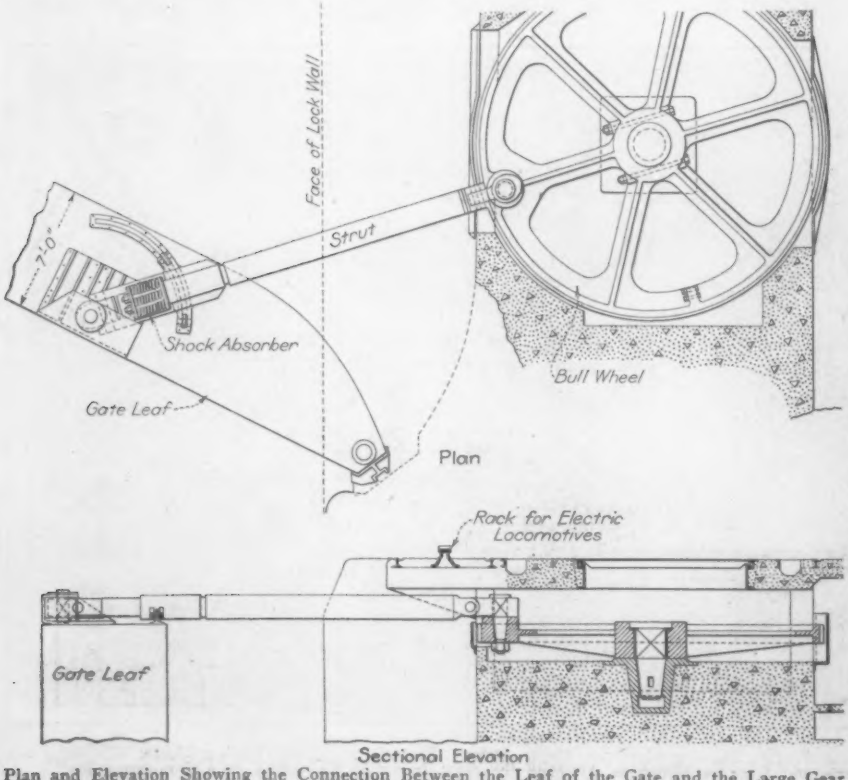
View of the Strut with Its Compression Springs to Take Shocks in Case of Obstructions

shown on page 1204. The halves are fastened together for machining, and it will be noted that only about one-half of the wheel is provided with teeth, this being on account of the wheel's operating only through a half circle. The half having the teeth also carries the crank pin for the strut arm and is known as the crank pin segment to distinguish it from the other or plain segment. The weight of the gear is 37,700 lb., and the outside diameter 19¼ ft., face 12 in., bore 20 in., and circular pitch 3.14 in. To machine one complete wheel, including the facing of the hubs, cutting teeth and boring requires 8 to 9 days of continuous work.

The Complete Spring Gear of the Reduction Gearing, 64 In. in Diameter

An important detail of the mechanism is the support for the bull wheel with the strut arm attached which support must also take up the thrust of the strut arm transferred through the gear as the gates are alternately opened and closed. The gear revolves about an 18-in. center pin, which is carried in a large manganese bronze bushing placed in the top of a center plate 6½ ft. square on its top surface and 4 ft. high. The manganese bronze bushing weighs no less than 630 lb. finished, and considerable difficulty was experienced in casting it on account of its large size. The center plate is imbedded in the concrete of the lock walls, and the weight of the center plate group including the bushings and small fittings is 20,300 lb. The 18-in. center pin is fastened in place by means of a large nickel steel wedge.

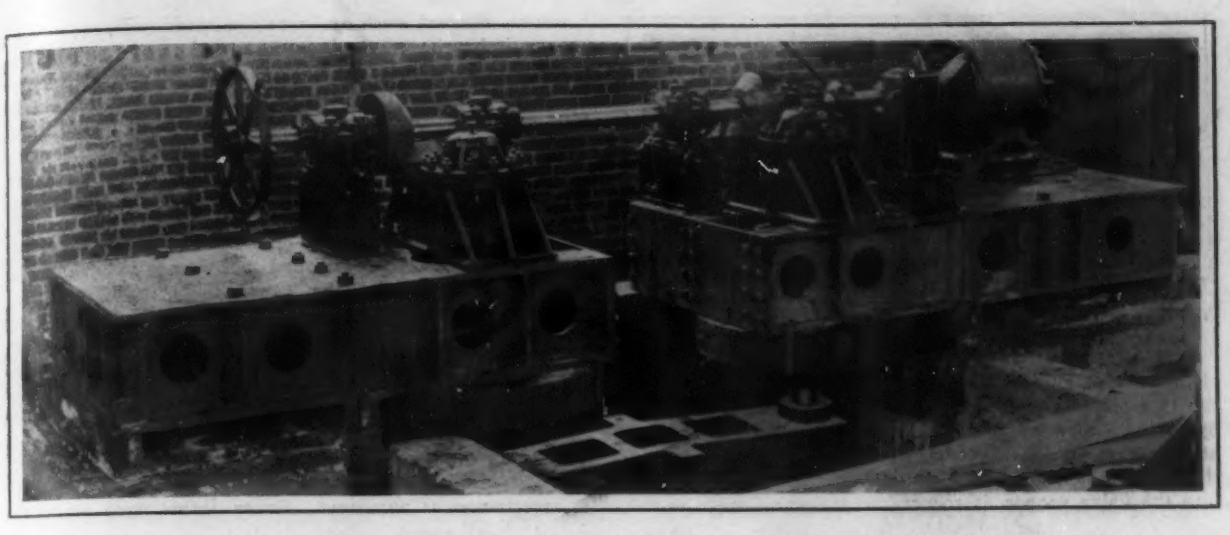
A semi-steel bulkhead separates the chamber containing the bull wheel from the chamber containing the electric motor, to make the latter water tight. The recess in the face of the lock wall in which the strut moves has its lowest point about 6 in. above the highest water level in the lock. The chamber containing the large gear wheel will therefore not be actually flooded, but is likely to be kept continually wet by the action of waves set up by vessels in the lock and by the gates in opening and closing. The use of the bulkhead is therefore to prevent flooding of the motor and electrical devices. One of the accompanying illustrations shows the irregular shape of the bulkhead, which in overall dimensions is 9½ x 7 x 6 ft., and weighs with its parts 17,000 lb. The upper of the two views on page 1199 shows the bevel gear driven by the motor and revolving the driving pinion for the bull wheel.



Plan and Elevation Showing the Connection Between the Leaf of the Gate and the Large Gear Driven by Motor Not Shown

It may be added that the weight of each leaf-moving machine, including the strut arm and connection, is about 50 tons. The 18-in. pin at the center of the bull wheel as well as the 10-in. pin at the wheel end of the strut and the 8-in. pin at the gate end are of forged nickel steel. The pin at the wheel and of the strut has a projecting head and is tapered on the lower end and provided with a nut and washer so that the strut arm can be disconnected quickly. The specially designed rig for testing the 10-in. nickel-steel yoke pins is shown among the illustrations, a pressure of 250 tons being developed by the hydraulic fluid, giving a fibre shearing stress of 45,000 lb. per square inch.

The motor for driving each leaf-moving machine takes current at 220 volts from a hydro-electric power plant at the Gatun dam and operates at a speed of 500 r.p.m. The speed is reduced by four sets of gears with ratios of 4 to 1., 6.1 to 1, 4¾ to 1 and 14⅜ to 1, so that

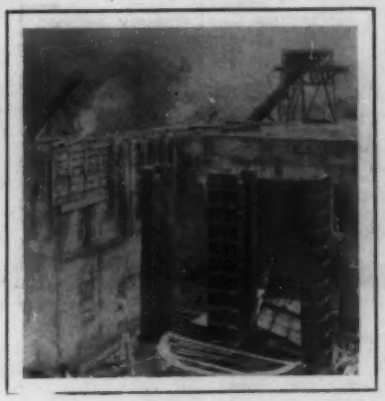


One of the Screws Being Cut on an Engine Lathe in a Trollhättan Shop, Sweden

the total ratio is about 1650 to 1, giving a speed to the bull wheel of less than 1 complete revolution in 3 min. As this wheel moves through approximately a half circle in opening or closing the gate, it will require approximately 1½ min. either to open or close. Reversal in direction is obtained by reversing the motor. The view of the assembly of the machine on page 1199 shows the spring gear wheel used as stated for absorbing shock, and a separate view of the wheel, which is 64 in. in diameter and weighs about 3000 lb., is given on page 1200.

Operating the Gates in Main Culverts to Locks

Some idea of the rising-stem valves and the machines to operate them may be gained from the illustrations on this page. The valves themselves had been arranged for under a separate contract, but the contract for the machines and lifting connections of the mechanism was also awarded to the Wheeling Mold & Foundry Company, for the entire 112 machines, which, as already stated, are for the valves which control the main culverts of the locks. The diagram shows the top of the valve, the elevating screws, the crosshead, which is driven up and down as the screws revolve, the valve stem by which the valve is suspended from the crosshead, and the superimposed electric motor and gearing for revolving the screws. The size of waterway closed by each of these rising stem valves is 8 x 18 ft. The maximum water pressure on each valve is 314 tons, at rest. The total vertical range of motion of the valve is 18 ft. The total weight of the moving parts is 22,500 lb. in air, and the valve is made of nickel structural steel and of steel castings. It was required that the valve be lifted by a stiff stem which must not rise above the coping of the lock. An interesting thing in this connection is that Mannesmann tubing has been used for the stems. The rising stem valve machines complete weigh about 7,200,000 lb.



Castings Receiving the Rising Stem Gates Shown in Place at the Canal

The valve stem passes vertically through a stuffing box in a horizontal water-tight bulkhead which closes the bottom of the machinery chamber from the space in which the valve works. The bulkhead is at a point 32 ft. below the high level of water in the lock. The valve rides against rollers to introduce rolling friction in place of sliding friction in moving the valve, and these are indicated in the diagram. The crosshead which lifts the valve stem also actuates the rollers, which obviously must rise with half the speed of the valve. To bring this about with certainty, the upper end of each roller train is connected to a vertical stem which also passes through the water-tight bulkhead, and the stem is raised and lowered by a chain passing over three sheaves and fastened to the crosshead, the arrangement being to give the velocity of the end of the chain attached to the stem one half the velocity of the other end. The guide frames for the machines had to be built into the masonry of the lock walls and was therefore ordered considerably in advance of the machines proper. One view gives some idea of this feature of the work as actually in place during construction of the locks. The material for the frames, also furnished by the Wheeling Mold & Foundry Company, amounted to about 9,000,000 lb.

The non-rising screws were made for the Wheeling Company, by Nydquist & Holm, Trollhättan, Sweden, and shipped direct to the Isthmus. One of the views shows the screw being turned on an engine lathe in the Trollhättan shop. The cross head is guided in its vertical travel by rollers running on rails imbedded in the concrete and each revolving screw is provided with double roller bearings at its upper end, from which it is suspended, the bearing at the lower end serving simply to guide and hold the screw, the weight being carried in suspension from the top. The 220-volt motors employed are arranged for either local or remote control and auxiliary hand apparatus is provided for closing the gate should the machinery fail when it is in the raised condition. A test of the machine was made by continuous running for one hour without load and for one hour with the load of 60,000 lb.

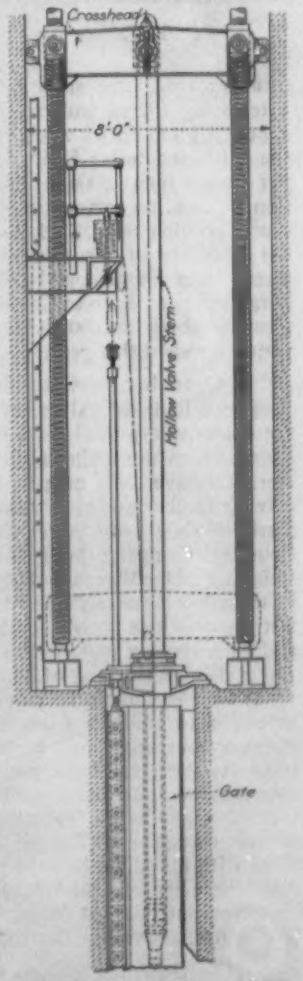
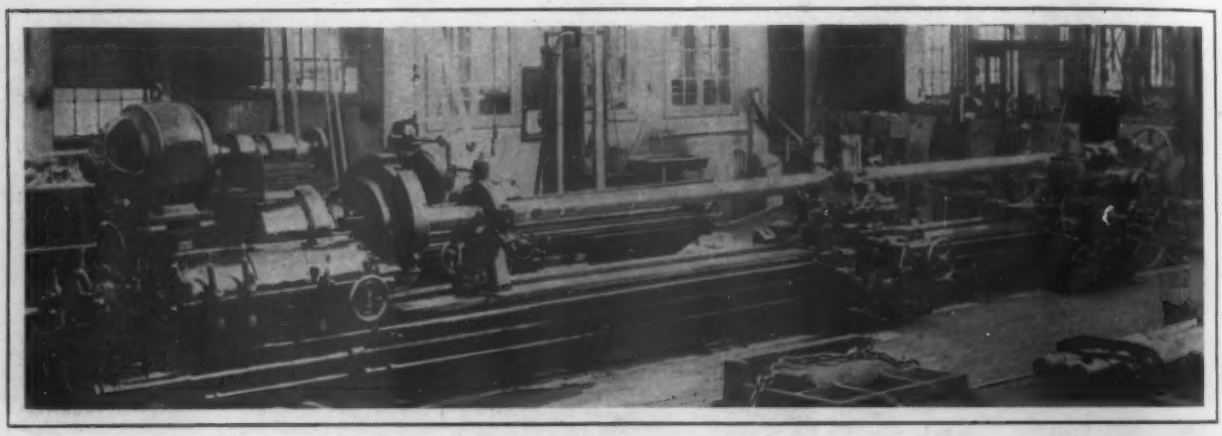


Diagram Showing Top of Rising Stem Valve Suspended by Hollow Stem from Crosshead Which is Raised and Lowered by the Screws Revolved by Motors

Two of the engravings show the character of the work done by the Mannesmannrohrenwerke, Dusseldorf, Germany, which furnished valve stems made of 8 in. outside diameter seamless hot-drawn steel tubing with an allowable variation in the walls of 21/32 to 9/16 in. in thickness. The length of these stems varies from 57 ft. 7 in. to 26 ft. 10 in. and the weight of the longest stem is about 3000 lb., where a tube is 30 ft. in length. Such a tube is composed of two sections held together by having each end counterbored and threaded, a threaded

A Length of Hollow Tubing for the Rising Valve Stem, the End in the Foreground Having Inside Threads for the Joint

sleeve, 12 in. long being screwed into each tube to draw the two pieces tightly together. The joint is made tight by having a copper ring of wedge shape cross-section placed at the union of the two lengths. The forged stem connection, which is shown in the illustrations, and which fits into the valve proper, is secured to the valve stem by the same means. The specifications required that the joints after being forced and riveted must be water tight against a head of 120 ft. of water and all the material must pass the following tests: Ultimate strength, 78,000 to 92,000 lb. per square inch; elastic limit, 43,600 to 50,400 lb.; elongation in 2 in., 20 per cent.; contraction in area 35 to 40 per cent.; bending test, 180 deg. around a diameter three times the thickness of the test piece. The stems were shipped direct from Dusseldorf by way of Antwerp on the Hamburg-American Line to Colon. The total shipment of valve stems is about 225,000 lb., and it is expected will be completely finished this year.



The Motor Drive for the Rising Stem Gates; at the Bottom of the Picture May Be Seen the Lifting Crosshead

Operating the Gates for Each Lock Chamber

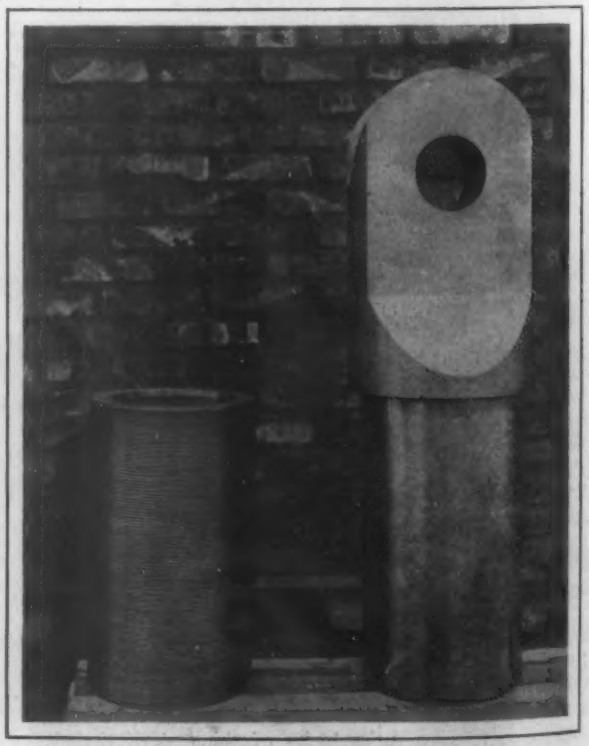
The cylindrical valves, as already stated, are located at the points where the lateral waterways for filling the locks connect with the main culvert. They are 6½ ft. in diameter, and have a lift of 3 ft. 1 in. Each is connected to its driving mechanism by a rising stem, which is driven by a machine shown on page 1203. The Wheeling Mold & Foundry Company built the machines, 130 in all, and weighing altogether about 550,000 lb. The motor shown in the view is merely one used for testing purposes. The test required one hour's continuous operation without load, and then 100 complete cycles with a load of 9,000 lb., and 100 cycles with a load of 14,000 lb.

The upper end of the valve stem terminates in a tubular extension to which is fixed a stationary nut. The nut engages a nonrising revolving screw driven by the mechanism. As the screw revolves, the nut rises or falls as the case may be and carries with it the valve stem at the bottom of which is the cylindrical valve. The space in the tubular extension of the valve stem underneath the nut is filled with oil, and when the nut rises the screw enters the oil. There are vertical holes in the nut and the entrance of the screw into the oil forces oil upward through the holes in the nut, providing the desired lubrication.

The General Problems of the Machine Builder

The foregoing account is calculated to prove the capabilities of the Wheeling Mold & Foundry Company for handling unusual work and work of magnitude, though, of course, it has been prominent as a maker of castings, but perhaps especially as a builder of rolling mill machinery. Its work with the Isthmian Canal Commission represents four important contracts, all secured in open competition. The company feels that its success in securing the work was due largely to the initiative and expense taken by the engineering department to familiarize itself thoroughly with the details of construction, the peculiar local conditions at the Isthmus and the details of transportation. All material had to be furnished according to a definite schedule laid out by the Commission, with penalties charged for delay in delivering material in the specified time. All machines are assigned to their definite place on the Isthmus before leaving the shop and all pieces comprising a machine are numbered to indicate the location, type of machine, etc. For recording the progress of work on all the different products from the casting or purchase of each item to its final assembling and shipment, a system of forms was devised so that the status of any machine can be ascertained at any time. Other forms were made up to cover progress of shipment of all material so that dates are available for all stages of the journey to the final delivery at the Isthmus.

For handling the large amount of work in the limited time, a new erecting shop with two traveling cranes was constructed, and a craneway 500 ft. long was built over



The Threaded Sleeve for Connecting Sections of the Valve Stem and the Forged End to Join Stem to the Valve Proper

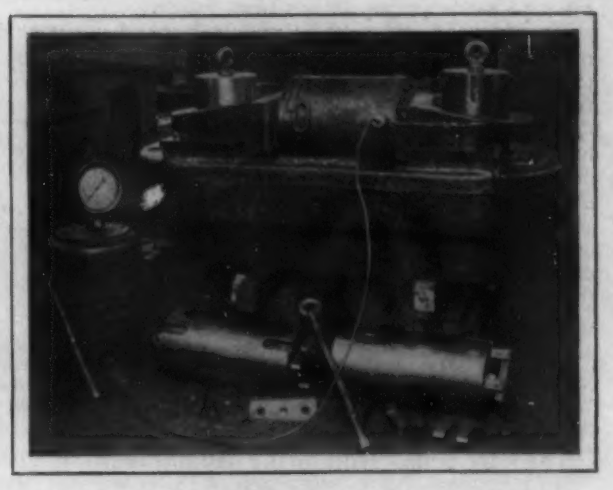
the casting yard and a general track rearrangement was made to load five cars at one time by means of the traveling crane. Additional gas engines for giving electric power and additional planing machines, gear cutting machines and other equipment were added. As it was, some of the machining was let by subcontract to the William Tod Company, Youngstown, Ohio. A large drafting force was required for planning rigs and jigs to handle the machine work and erecting economically. Finally, besides the contracts awarded directly to the company (for making the mitering gate moving machinery, the cylindrical-valve operating machines, the rising stem valve operating machines and the frames for the rising stem machines), and the castings for the McClintic-Marshall Construction Company for the mitering gates, the company took a number of other contracts for the canal work including 130,000 lin. ft. of copper conductor rail for the electric towing locomotives. The section of the rail, which was adopted by the Commission, was designed by the engineers of the Wheeling Mold & Foundry Company, to facilitate the fastening of the conductor bar in place. These rails were made by the extrusion process, by the Coe Brass branch at Ansonia, Conn., of the American Brass Company as subcontractor.

The design and installation of the gate-opening machinery is in charge of Edward Schildhauer, electrical and mechanical engineer reporting to Col. H. F. Hodges, Corps of Engineers, U. S. A., assistant chief engineer to Col. George W. Goethals, Corps of Engineers, U. S. A., chairman and chief engineer of the Isthmian Canal Commission. The personnel of the Wheeling Mold & Foundry Company is C. E. Blue, president of the company since its organization in 1897, L. V. Blue, vice-president, F. du Pont Thomson, chief engineer, H. S. Bradley, secretary, H. Quarrier, treasurer, W. V. Hoge, Jr., business manager, and E. C. Rauschenberg, superintendent of the company's works.

Machining the Reaction Castings in a Double-Head Planing Machine Built for the Work

The Hess-Snyder Company, Massillon, Ohio, is installing in its foundry a number of molding machines of the Vulcan, Buchs and Adams types.

One of the Cylindrical Valve Machines Under Test



Special Rig for Testing Nickel-Steel Yoke Pins

Crane Company Will Build Large Plant

The Crane Company, Chicago, concerning the sale of whose present plant site on Canal street mention was recently made in *The Iron Age*, has acquired a tract of 200 acres in the outlying manufacturing district at the southwest side of the city, abutting on the Drainage Canal and near the corner of Kedzie and Archer avenues. It is the intention to concentrate gradually all the Chicago plants of the company on this site. Building plans are being prepared involving initial expenditures approximating $5,000,000. The site is near the Santa Fe and the Indiana Harbor Belt railroads.

Fuel Oil in Northern Ohio

Reference has been made to the action of the Standard Oil Company of Indiana in notifying its customers that when present fuel oil contracts expire in 1913 they will not be renewed. The Standard Oil Company is now refusing to renew its usual yearly contracts with Ohio consumers for a longer period than for six months, and is taking on no new contracts whatever, limiting its supply to its old customers. The company gives the scarcity of fuel oil and the high prices of crude oil as reasons for declining to make longer contracts. Users of fuel oil are worried over the possibility that at the expiration of their six months' contracts their supply will be entirely cut off. The scarcity has also resulted in a sharp advance in price, which is sufficient to cause manufacturers to turn their attention to other kinds of fuel even if they had assurances that their supply of fuel oil would be continued. As representing this advance in Ohio, fuel oil is now quoted for Cleveland delivery at about 4c. a gal. in tank car lots, as compared with 2.25c. a year ago.

The cutting off of the supply of fuel oil in several of the states in the Northwest and Central West has already resulted in a heavy demand for gas producer plants, and makers of such apparatus are getting orders faster than they can fill them. According to the reports of the manufacturers, the field for gas producers is rapidly broadening to industries outside of open-hearth plants and steel foundries, and numerous orders are being placed for small producer units for widely varied manufacturing industries. Many forge shops are expected to replace fuel

oil with producer gas in the near future.

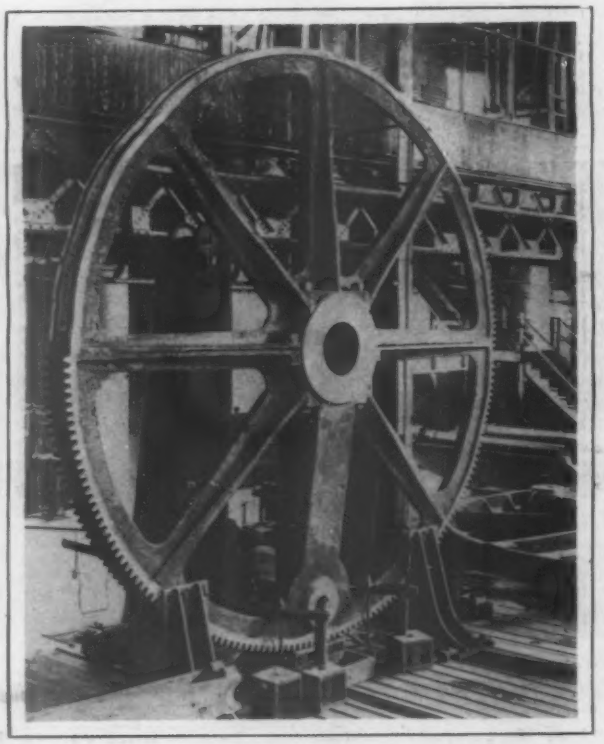
In Cleveland and most of the other industrial centers of northern Ohio, many manufacturers use natural gas for fuel, preferring it to other fuels. At present prices natural gas is regarded as a very satisfactory and economical fuel. While there are no immediate indications of a falling off of the natural gas supply, this fuel has one serious disadvantage. In case of a breakdown of mains or an extra heavy domestic demand because of intensely cold weather, the natural gas contracts with manufacturers provide that their supply can be cut off when necessary so that it can be diverted to the needs of domestic users. Thus the danger always exists of a shortage

The Rough Casting of the Bull Wheel Indicating the Large Risers Used

Syracuse Iron Mine Abandoned

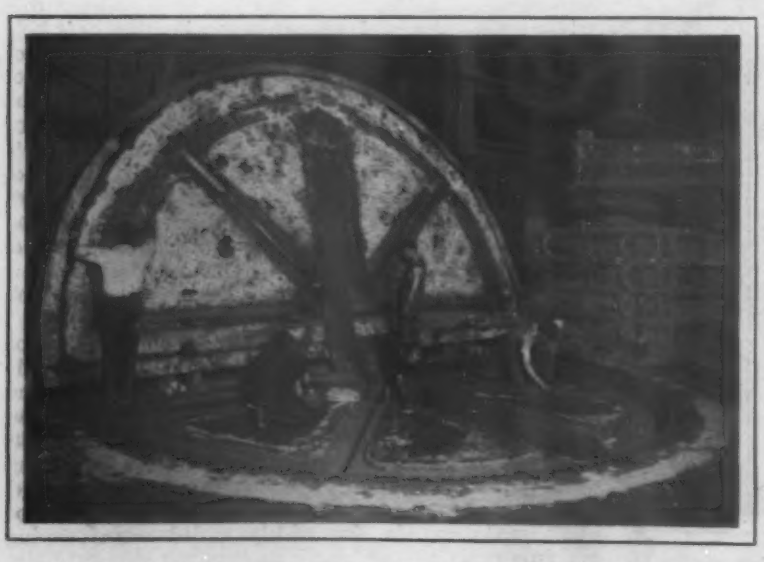
Pickands, Mather & Co., Cleveland, have finally abandoned the Syracuse mine. The efforts to open the property and take out its ore have proved unsuccessful. The buildings are being dismantled and removed to the Bangor location, one mile distant. The Syracuse is in the Lake Embarrass field, near Biwobik, Mesaba range. Drills have shown it a valuable property. While the deposit of ore is not extraordinarily large, the grade is excellent. Unfortunately, however, the over-burden consists of quicksand. Attempts to reach the ledge by ordinary methods of sinking ended in failure and a reinforced concrete shaft was put difficult, but it was thought that with bedrock attained down. This work was most the troubles were practically over. The water problem, which had been serious from the start, became still more baffling, however, and to take care of the underground torrent it was necessary greatly to augment the pumping capacity.

The ore deposit was finally tapped and enough ore to fill two cars was taken out. Then it was discovered that the removal of the quicksand pumped out with the water had taken away much of the "ground" surrounding the workings and had left the concrete shaft unstable and practically impossible of use. The lease to the property was surrendered. Now, no other concern caring to take over the tract, the buildings are being dismantled.



One of the Bull Wheels in Process of Machining Showing the Extent of the Tooth Surface

It is believed that the cost of the undertaking was more than $1,000,000. It is the general theory that the water comes from the nearby Embarrass river, possibly an underground branch of that stream, and it is the belief of some mining men that not until the bed of the river has been given a floor of concrete will it be possible to mine the Syracuse ore or other undeveloped deposits in the locality. This work would, of course, cost a very large sum. The development of the Bangor mine by Pickands, Mather & Co., while it has been a success, was attended with great difficulty in its earlier stages. Water and quicksand offered many perplexing problems, which were successfully solved. The Bangor deposit is larger than that at the Syracuse mine, but the grade of the ore is not as good.



Molding One-Half of the Bull Wheel for the Gate Operating Mechanism

Philadelphia Associated Foundry Foremen

The Associated Foundry Foremen of Philadelphia and Vicinity held its monthly meeting in that city on the evening of November 13. The following officers were elected for the coming year: President, John Alexander, Harrison Safety Boiler Works; vice-president, John McCoy, Philadelphia Chaplet Company; secretary-treasurer, C. R. Brown, E. E. Brown & Co.; trustee to serve for three years, A. A. Miller, of *The Iron Age*. Lewis R. Palmer, of Philadelphia, representing the Osborn Mfg. Company, Cleveland, Ohio, was elected to membership. An interesting address followed by Paxson Deeter, of Philadelphia, on "Efficiency." He outlined many of the methods inaugurated by F. W. Taylor in arriving at his conclusions in connection with efficiency work, and strongly suggested that, while it might not be possible in all cases to apply Mr. Taylor's system, there were undoubtedly a number of efficiency methods which could be adopted in general practice for the betterment of the foundry trade. A discussion ensued in which practically all present participated.

A New Clay Gun for Blast Furnaces

A Machine for Plugging the Tapping Hole When the Blast Is on Nearly Full

One of the most familiar tools at the modern blast furnace is the Vaughn clay gun, used for plugging the tapping hole after a cast. The usual method of using it is to shut off the blast while workmen adjust the gun to the tapping hole and force in the clay. F. H. N. Gerwig of the Pittsburgh Steel Company, who was formerly assistant superintendent at the Carrie furnaces in the Pittsburgh district, has invented a clay gun and an apparatus for using it which make it possible to stop the tapping hole with clay without taking off the blast. The furnace is checked so as to drop the blast pressure down to about 9 lb., and it is considered possible, under particularly favorable conditions, to stop the hole without reducing the blast pressure. Mr. Gerwig's mechanism is moved into and out of operative position without the employment of workmen for the actual handling of the gun. The actuating mechanism is controlled by valves some distance from the immediate front of the furnace.

Fig. 1 shows the iron notch of the blast furnace in longitudinal section, with the clay gun and operating mechanism as devised by Mr. Gerwig. Fig. 2 is a front elevation of the furnace and apparatus.

The cylinder of the clay gun is provided with horizontally extending trunnions, which secure it to a trunnion yoke so as to permit of angular adjustment. The gun is swung around into alignment vertically with the center line of the tapping hole and trough by an arm and a sliding sleeve which encircles an enlarged portion of one of the furnace-supporting columns as shown. The sleeve is secured to one end of a chain passing around sheave wheels mounted on the upper end of the column. The cable also passes around a sheave wheel secured on a bracket fixed to one of the building columns supporting the furnace cast house. The lower end is secured to the piston rod of a fluid pressure cylinder attached to the same column. The other end of the piston rod carries a counter weight, which in part counterbalances the weight of the lifted parts of the clay gun and supporting mechanism. The motions of the gun and its frame are controlled by four-way valves admitting water to the various pipes shown in the illustrations. The cylindrical yoke supporting the gun moves partly spirally around the column and partly vertically in its path, and in this way the gun is placed in exact position to stop the hole without the assistance of any men to place it.

With the clay gun now commonly used the barrel is partly filled with clay before the furnace is tapped. When the iron has all been tapped out and the furnace begins to blow the engines are slowed down; then the relief valve on the cold blast line is opened to take off the pressure from the furnace and to prevent the gas from blowing out at the tapping hole. The stoves are closed from the cold blast main to allow the workmen to insert the gun into the tapping hole and force in the clay balls, which are thrown one at a time into the gun. The Gerwig gun has a large enough clay barrel to carry sufficient clay to stop the tapping hole with the blast on. Of the four-way valves at the side of the cast house one lowers and raises the gun, another inserts and withdraws the nose of the gun, and a third forces the clay into the hole.

The inventor figures that with six casts a day, estimating 3½ minutes lost in stopping the hole after each cast, the loss of product in the total of 21 minutes is 5.16 tons. For a year this would amount to 1858 tons, or 1.15 per cent. of the production of a furnace making 450 tons in 24 hours. The other advantages claimed are a more regular working furnace, since blast pressure often increases after a cast, due to tightening up of the stock in the bosh and the lower part, caused by settling down in the removal of the blast; the saving in wages, since no men are required in front of the tapping hole, representing a possible decrease of one man per furnace; ability to keep cinder from running back into the blowpipes and filling them up when the furnace is working badly. Sometimes after a cast it is impossible to take off all the blast to stop the hole, on account of this tendency of the cinder to go back into the blowpipes, and sometimes full blast has to be kept off an hour or more after cast before it is practicable to stop the hole, whereas with the arrangement shown it can be stopped at once. There is also a saving in fire clay and in increased production.

The Ferracute Machine Company, Bridgeton, N. J., has arranged with William T. Barker, formerly proprietor of the Bridgeton Iron Works, who has had contracts for the company's castings for several years, to build a new foundry adjoining the Ferracute plant. He intends to build it of modern design, of brick and steel, about 90 x 108 ft., with arrangements for future lengthening when desired to increase the present capacity. It will be equipped with electric cranes, pneumatic hoists, pneumatic chipping and cleaning devices, etc., and will probably be ready for operation within six months. Mr. Barker's engineer is David Townsend, 1716 Spring Garden street, Philadelphia, Pa. The Ferracute Company has an arrangement with Mr. Barker whereby it can purchase the foundry at some future date if desired, as it will be practically equipped for the work of that company, whose requirements for iron castings for the past year have been between 1000 and 1500 tons.

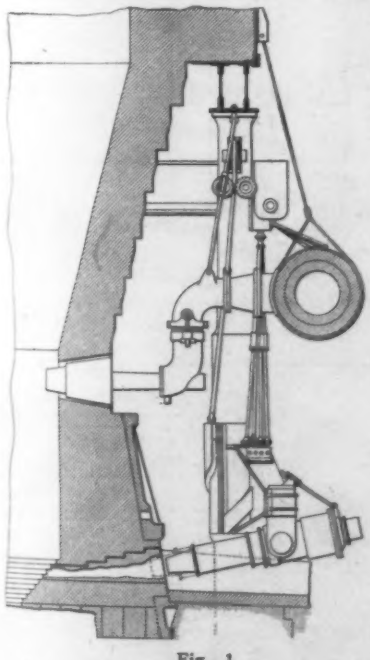


Fig. 1.

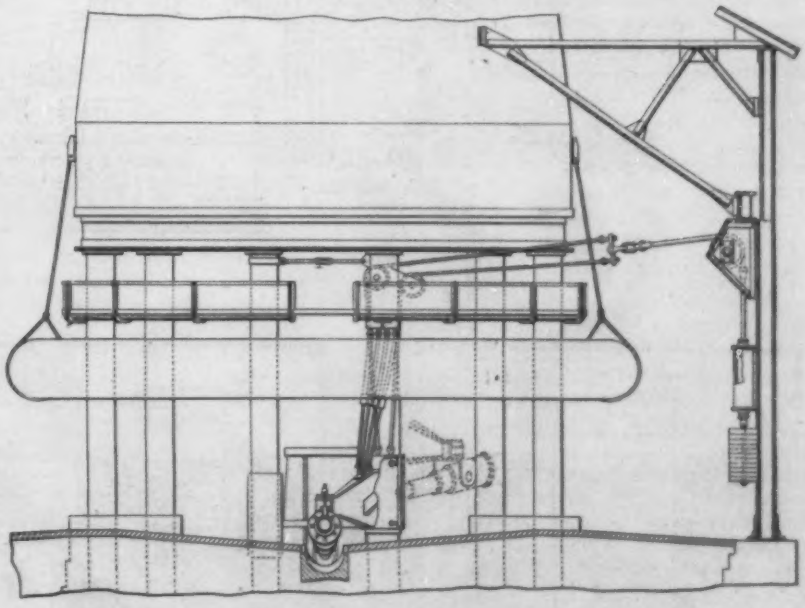


Fig. 2

Section and Front Elevation of Blast Furnace, Showing the Construction and Method of Applying the Clay Gun of F. H. N. Gerwig

Power Plant of an Ore Washery

High-Duty Pumping Engine and Steam Turbine Electric Unit

In connection with its new iron-ore washing plant at Nashwauk, Minn., the Wisconsin Steel Company, South Chicago, Ill., has built a modern power and pumping plant. It was designed by A. U. Leonhauser, chief engineer, and the details are shown in the accompanying drawings. A distinctive feature is the condensing system, although a number of other noteworthy improvements over ordinary practice will be observed from the following description:

The power house, located near the shore of a small lake, contains a steam turbine unit of 500 kw. and a steam-driven pumping engine with capacity of 2500 gal. per minute. Steam is supplied from two Stirling boilers set in battery and rated at 254-hp. each, manufactured by the Babcock & Wilcox Company. The working pressure is up to 180 lb., but normally 160 lb. They are equipped with Jones underfeed stokers, and from each furnace the products of combustion pass to an individual stack 4 ft. in diameter, rising 110 ft. from the floor line. The boilers are also furnished with McDonough automatic feed water regulators.

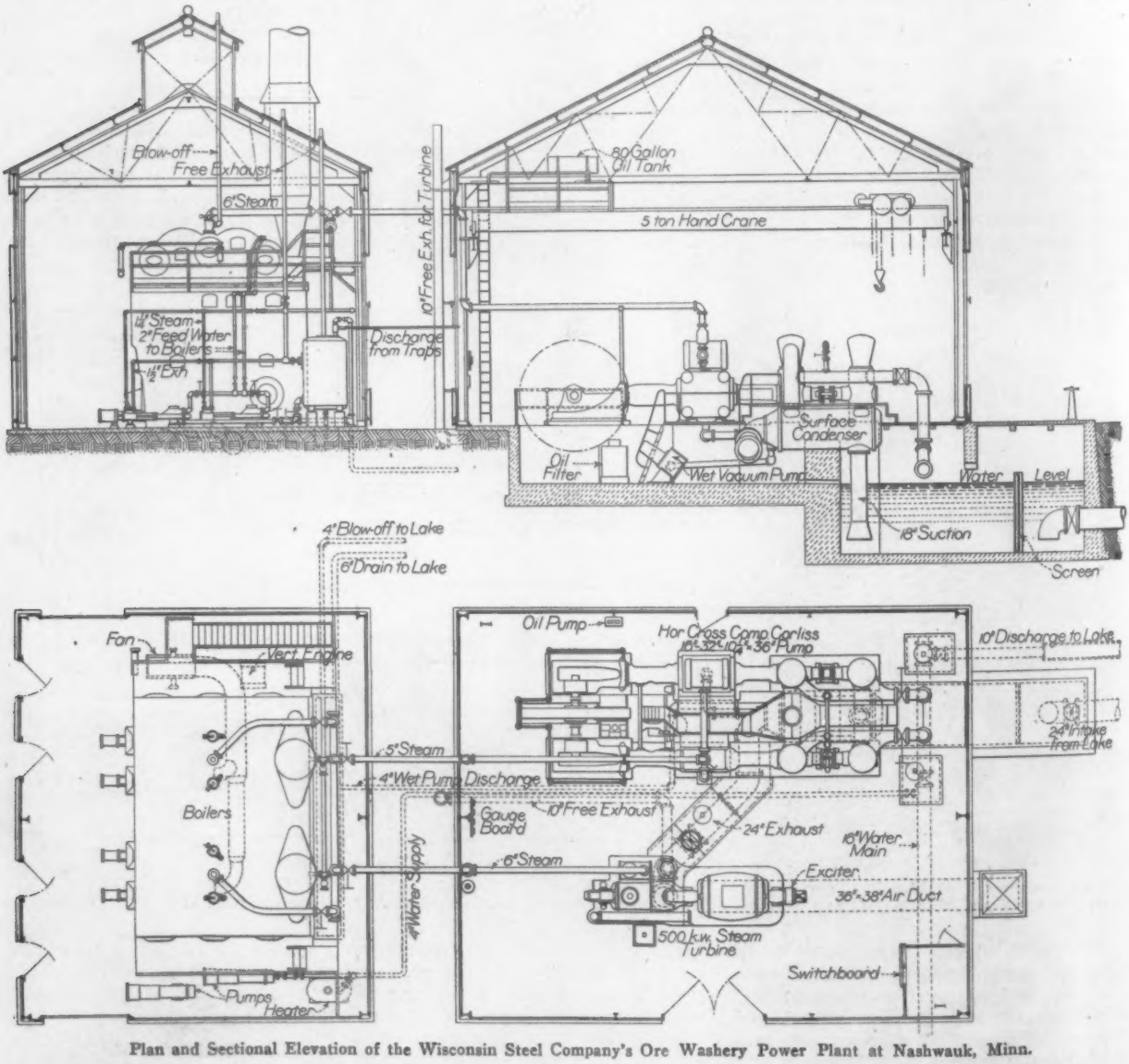
Feed water from the lake is supplied to the boilers through a Stillwell heater by two 7½ x 4 x 10-in. Worthington pumps, which have outside center-packed water plungers. This feature is unusual except in power plants of the larger size. It enables leakage to be readily detected and remedied by re-packing. Brass covered plungers and bronze piston rods are used. The steam end is of the standard Worthington type for duplex pumps, fitted with flat valves.

Steam from the boilers is collected in an 8-in. header and passes through a 5-in. feeder to the pumping engine. This is a Prescott machine of the cross-compound horizontal high-duty type. It has steam cylinders, 16 and 32-in. in diameter, in tandem with water plungers of 10¼-in. diameter. The common stroke is 36 in. Delivery of 2500 gal., as mentioned, is made against a head of 250 ft., with steam pressure of 140 lb. The engine is equipped with Corliss valve gear of the latest Prescott pattern, and the governor is arranged so that the speed can be varied, when running, between one-third and full capacity. Steam from the high-pressure cylinder passes to the low-pressure side through a reheating receiver.

The water pumped is taken through a 24-in. main, 126 ft. long, from an intake, well out in the lake, and passes a screen before reaching the pump section. This water is discharged to a 16-in. main leading to an elevated steel tank and thence distributed, at 70-lb. pressure, to the mill for washing the ore. For the boiler feed sufficient water is drawn off from the 16-in. main through a 4-in. pipe. Water can also be by-passed and returned to the lake through a 10-in. discharge pipe when required.

The steam turbine unit, of Allis-Chalmers make, takes its supply from the boilers through a 6-in. feeder. The turbine was designed to operate at 3600 r.p.m. and the speed is regulated by a governor driven from the shaft by gears working in an oil bath. The governor, by means of a relay, actuates a balanced throttle valve. An abundance of oil is supplied to the bearings of the turbine and generator by means of a small cycloidal pump driven from the turbine shaft.

Coupled to the turbine on the same bed-plate, is a 3-phase 60-cycle alternating-current generator, designed for a terminal pressure of 2300 volts. This is rated at 625



Plan and Sectional Elevation of the Wisconsin Steel Company's Ore Washery Power Plant at Nashwauk, Minn.

k.v.a., yielding 500 kw. under normal load at 80 per cent. power factor. It is of the standard revolving field type. Excitation is effected by a 10-kw. direct-current generator on the same shaft. There is forced ventilation of the turbo-generator coils by a fan forming part of the rotor, air to which is admitted from outside the power house through a 36 x 38-in. duct provided with a special screened intake.

In the arrangement of the condensing plant a combination has been effected that is unusual for a plant of this kind and has been found highly economical. The exhaust from both the steam turbine and the pumping engine passes to a surface condenser, having 1500 sq. ft. effective area, which was furnished by the International Steam Pump Company. It is located in the suction of the pumping engine. By this means the practice inaugurated at municipal high-duty water works stations, of utilizing for cooling purposes all of the water drawn in by the pumping engine for delivery to service pipes, has been taken advantage of for the entire plant. The condenser is of sufficient capacity to bring about 28 in. of vacuum, referred to a 30-in. barometer, at the exhausts of both the pumping engine and turbine. All condensate is removed by a 17 x 10-in. Prescott suction valve-less double-acting air pump driven from the main crank shaft by means of an eccentric.

Lubrication of the power and pumping machinery is effected by a combined gravity and force feed system, as partly indicated in the foregoing, the oil being stored in an 80-gal. tank located just under the roof trusses. After being used, it flows to a White Star duplex oil filter, furnished by the Pittsburgh Gage & Supply Company, is cleansed and then returned to the tank by a Moore oil pump.

Coal for the plant is unloaded from a trestle in front of the boiler room doors and shoveled to the hoppers of the stokers.

The ore washing plant, for which the power and pumping station was built, is equipped throughout with electric drive. The motors are 3-phase 60-cycle 440-volt machines supplied with current from the turbine unit through two 150-k.v.a. 2200 to 440-volt oil insulated self-cooled transformers.

A Great Southwestern Hydroelectric Project

E. C. Alexander, Marble Falls, Texas, who is building a large reinforced concrete dam across the Colorado River near that place for the purpose of operating a hydroelectric plant he will install, is promoting the construction of another dam across the same river at a point 25 miles above Austin. The new dam will be 150 ft. high and 1820 ft. long; will be located at Lohman Narrows and will form a reservoir that will extend up the river for 47 miles. It will provide the initial power for what is expected to be the largest hydroelectric plant in the Southwest, making available approximately 100,000 hp. It is the purpose of Mr. Alexander and his associates to construct power transmission lines from the hydroelectric plant to cities and towns within a radius of 150 miles. The project is said to have been financed and surveys for the works are being made. The site of this proposed dam is only about 22 miles above the dam which the city of Austin is constructing across the same river.

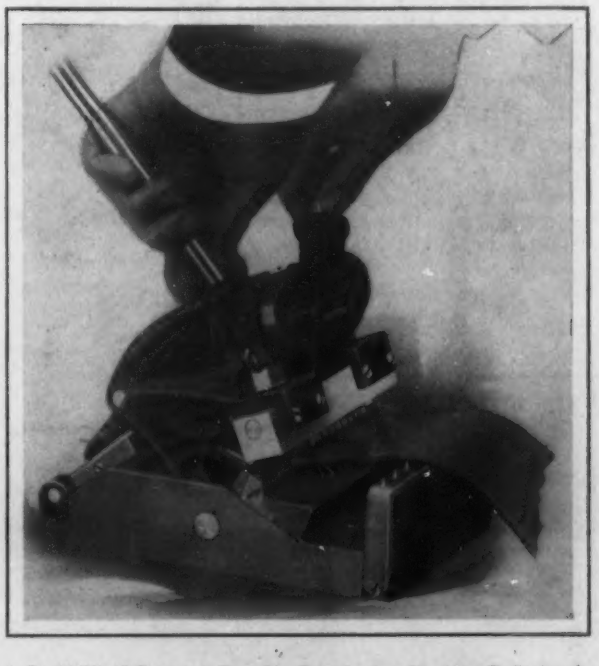
For the first 10 months of the current year a total of 11,675,780 tons of coal was mined in Indiana, compared with 13,837,397 tons for the whole of 1911, notwithstanding two months' idleness last spring, pending an agreement between operators and miners. Coal is mined in 21 of the 92 counties of the State. Approximately 400 small mines, employing 10 men or less, do not make reports. Sullivan County has passed Clay County as the leading producer. At one time the latter mined more coal than all the other counties combined. Its output was block, but scarcely 5 per cent. of the Indiana coal production is now block.

The Vermillion Malleable Company, Chicago, has filed notice of a change in its name to the Vermillion Malleable Iron Company, with an increase in capital stock from $50,000 to $125,000.

A Small Portable Belt Lacing Machine

In 1907 the Clipper Belt Lacer Company, 1006 Front avenue, N. W., Grand Rapids, Mich., secured the American manufacturing rights on an English belt lacing device. In its original form the machine was used with a mallet and the hooks were placed in the tool singly. Improvements were made until in the fall of 1910 the first card of hooks for the machine was ready for the market. Since that time a number of improvements have been made, until the machine in its present form is of the type shown in the accompanying engraving.

The hooks used for lacing the belt are carded on a strip of paper that is wide enough to fill the entire machine. This card is inserted in the machine, the pin put



A Small Hand-Operated Portable Belt Lacing Machine Built by the Clipper Belt Lacer Company, Grand Rapids, Mich.

in which holds the hooks in place and the paper removed. If the belt to be laced is narrower than the machine the card can be cut to the desired width with a pair of scissors before it is inserted. For ease in operation the ratchet is hinged on the base of the machine so that it can be laid back out of the way. This permits the center and side heads which hold the clinch bar to be also laid out of the way and gives free access to the lacer to insert the hooks. The lining bar which meshes into the lacer and engages the hooks is handled by plungers in the side heads backed up by springs. In this way when the side and center heads are brought forward, the plungers engage the lining bar, thus keeping the hooks in alignment during the operation.

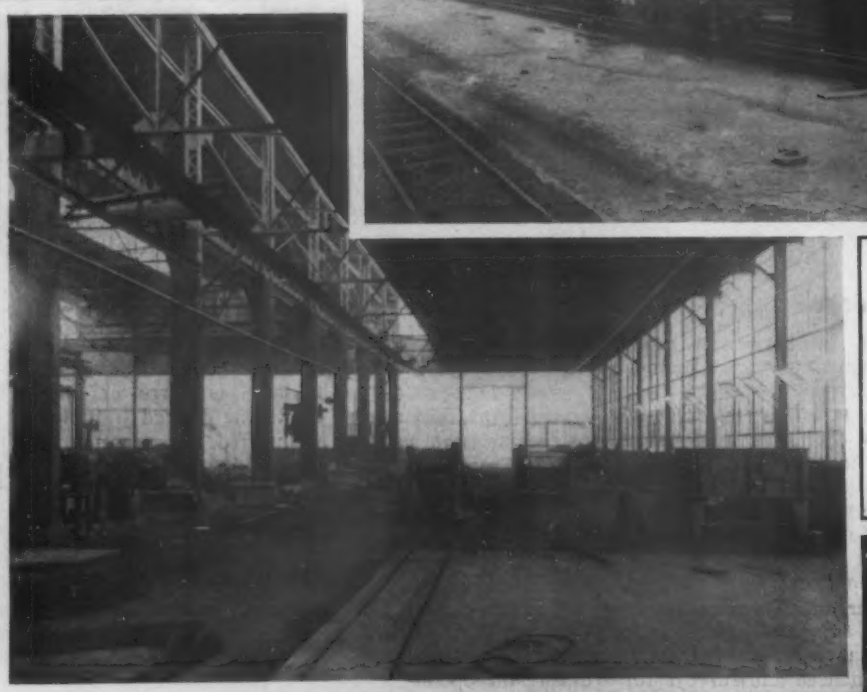
The center head is brought forward until the clinching bar comes in contact with the hooks. The ratchet is then brought forward into position and the pawl engages it. The belt, which is held in place by the bracket shown on the front of the tool, is then inserted between the hooks and the levers are pressed down. As the levers are released the pawl engages with the ratchet and moves it one notch, the operation being repeated until all the hooks are pressed in flush with the surface of the belt. The other end of the belt is finished in the same way and the rawhide pin inserted to connect them, the time required being less than 5 min.

A passenger steamer named Seeandbee, said to be the largest side-wheel passenger steamer in the world, being built for the Cleveland & Buffalo Transit Company, was launched November 9 at the Wyandotte, Mich., yards of the American Shipbuilding Company. It is 500 ft. long and 97 ft. 8 in. wide and will be driven by a 12,000-hp. triple-expansion engine. It will be placed in commission between Cleveland and Buffalo early next summer.

Massillon Bridge & Structural Company's Shop

Interesting Details of Shop Arrangement and Oil Burning Forge Equipment in a Recently Completed Fabricating Plant

The new plant of the Massillon Bridge & Structural Company, Massillon, Ohio, is housed in a single building measuring 400 ft. in length. The structure was designed and erected by the Bridge Company and is a steel framework carried on concrete foundations and inclosed on all sides with steel-frame windows. As will be noticed from the accompanying engravings, these windows extend from a point in the concrete side wall about 3 ft. above the ground to the eaves, and at the ends the space between the windows and the roof is covered with corrugated galvanized-iron sheets. Additional windows are located between the roof of the middle bay and those on the side ones, so that, as can be seen from the accompanying illustrations, the plant is an extremely well lighted one. The total inclosed floor area is 62,400 sq. ft. and the building is divided longitudinally by rows of columns into three bays, a large central one, 69 ft. wide, and two smaller side ones, each of which measures 43 ft. in width.



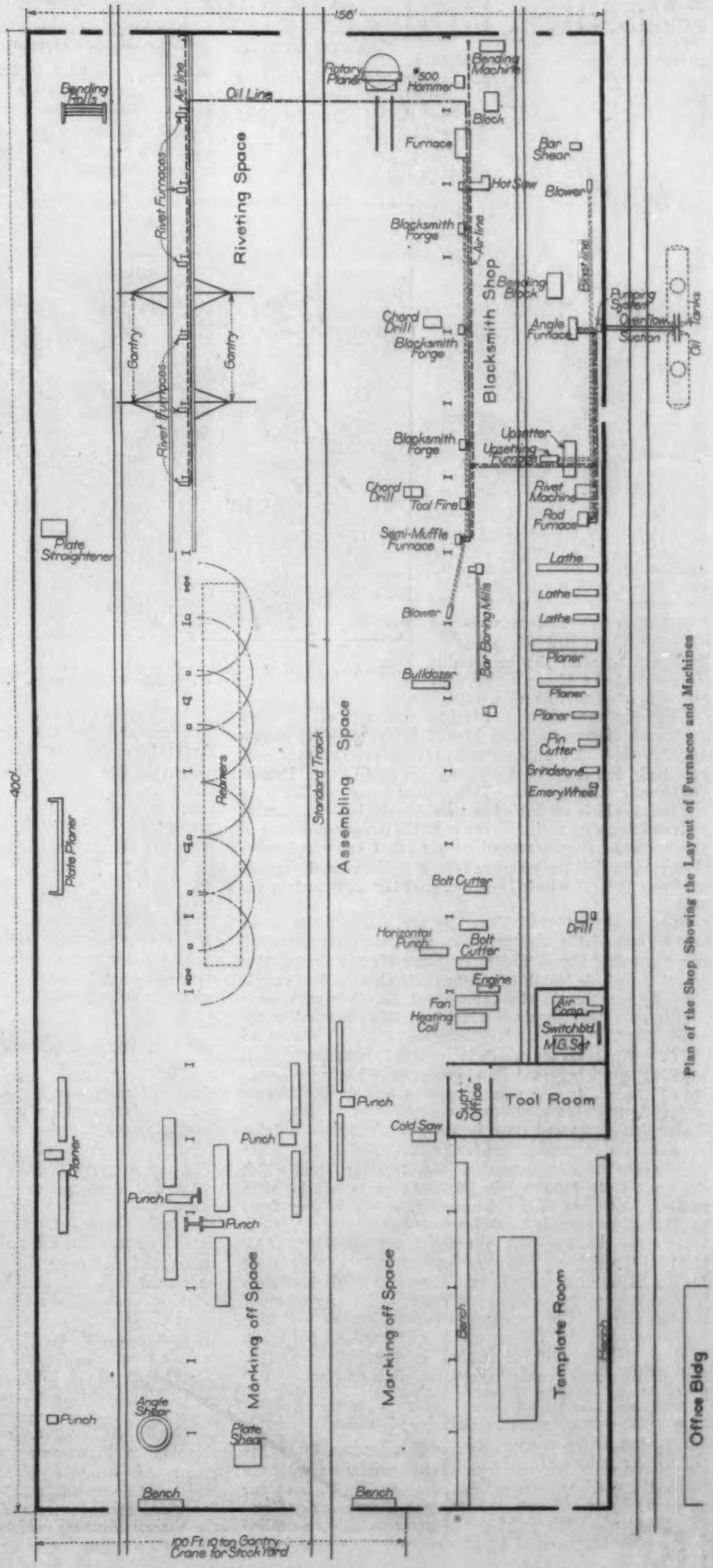
Views in the New Shop of the Massillon Bridge & Structural Company, Massillon, Ohio. The Top Engraving is a View of the Riveting Department Showing the Oil-Fired Rivet Forges and the Double Jib Cranes; the Middle One is Reproduced from a Photograph Taken Looking Toward the End of the Blacksmith Shop, and the Bottom One Shows the Angle Shearing and Punching Machines in the Left Bay

Through the central bay a standard-gauge track is laid, which connects with sidings from the Pennsylvania and Baltimore & Ohio railroads. Five electric traveling cranes, one of 5 tons, two of 10 tons and two of 15 tons capacity, serve this bay. The routing of the material through the plant is such that it passes almost directly up the plan view of the shop which is reproduced herewith. From the stockyard, which is traversed

by a 10-ton 100-ft. gantry electric crane, having a runway 300 ft. long, the material passes through the marking off, punching, assembling, reaming and riveting departments and emerges at the opposite or upper end of the building ready to be loaded on cars and shipped.

At the end of the left bay opposite the stockyard is the riveting department, a portion of which is shown in the top engraving of the accompanying halftone group. As can be noticed from the line drawing showing the layout of the plant, arrangements have been made to do riveting in this side bay and also in the central one. Pneumatic bull riveting machines hang from the jib cranes which traverse the full length of the riveting space in both bays and are also shown. Hot rivets are furnished for this department by four stationary type oil-burning rivet forges, which are fitted with a new burner that controls both the air and the oil supply by a single lever. The arrangement of this burner is such that the ratio between the oil and the air entering the furnace is always the same, being maintained at the point which gives the best atomization regardless of how high or low the burner may be turned. The air pressure used is about 15 lb., while that of the oil is approximately 5 lb. higher, and it is emphasized that with this burner the minimum possible amount of oil and air is used at all times. To maintain the compressed-air pressure at 15 lb. a reducing valve is placed on the branch line from the shop main, which reduces and keeps the air pressure uniform. The supply pipes for both oil and compressed air are run in a trench under the forges, as is shown in the layout diagram, and provision has been made for a future installation of two additional forges when the present equipment is outgrown.

Directly across the shop from the riveting department in the right bay is the blacksmith shop, a portion of which is reproduced in the middle halftone. The row of furnaces at the left are oil-burning blacksmith forges, the three in the rear being for general blacksmith work, while the smaller one in front is used for tool dressing. At the extreme left close to the column is a small semi-muffle type of furnace for hardening and tempering tools, etc. The burners on these furnaces are of the



Plan of the Shop Showing the Layout of Furnaces and Machines

same type as that used on the rivet forges, but in addition air blast is supplied by a No. 2 American blower to furnish the air for combustion. This combination of compressed air for atomization and air blast for combustion is said to result in a much more efficient burning of the fuel than with the straight high or low pressure systems. The amount of air required is small and the oil is atomized and injected in the furnace in a fine mist, while the air blast furnishes the necessary air to support combustion and also gives an easy means for controlling the nature of the fire.

A separate branch air line supplies the blacksmith shop and is fitted with the same type of reducing valve as is used in the riveting department. At the right of the same engraving may be seen the rod furnace, which makes heats 4 ft. long and supplies heated material for the rivet-making machine, which will be located directly beside it when the shop is fully completed, the photographs from which the engravings were reproduced having been taken before much of the machinery was installed. In the center of the engraving is a bolt heading and upsetting furnace, the back being turned toward the camera. This furnace has an adjustable slot for regulating the size of opening to correspond with that of the stock by raising or lowering the adjustable arch. The burners on these furnaces are of the same type as those on the blacksmith forges and the piping layout can be seen from the diagram.

Between the rod and the bolt-heading and upsetting furnaces adjacent to the right wall is the pumping system for the oil, which, together with the furnaces, forges, etc., was built and installed by Tate-Jones & Co., Inc., Empire Building, Pittsburgh, Pa. This system pumps the oil from the tanks, which are buried just outside the building, strains it free from dirt and delivers it at the proper pressure to the burners. It is arranged with a relief valve and overflow pipe so that the pressure is kept uniform in the supply line and the oil which is not required is returned to the tank.

The stockyard end of the left bay is illustrated in the bottom one of the accompanying group of halftones, and the engraving shows the three 5-ton electric cranes that travel the whole length of the bay and also the large angle shearing machine in the foreground, together with some of the punching machines which are being erected in the background.

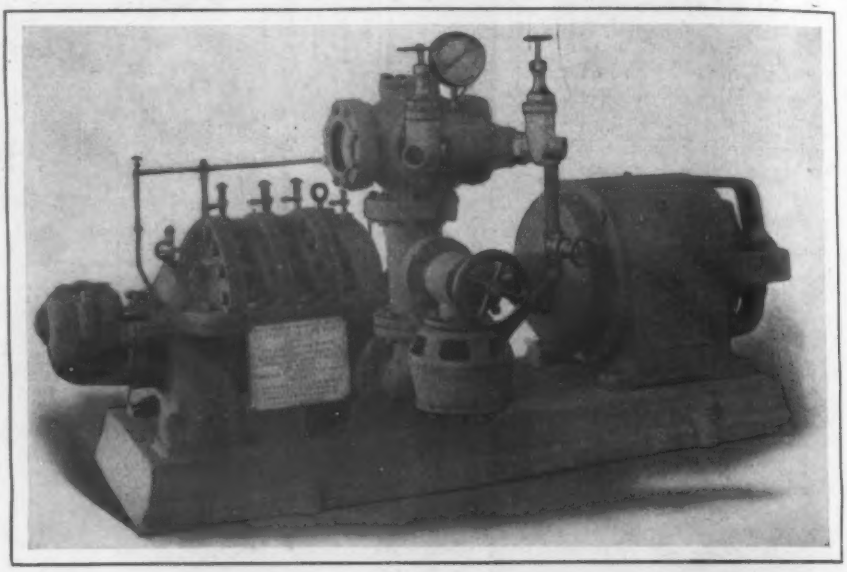
The compressed air which is required about the plant is supplied by an Ingersoll-Rand compressor having a capacity of 534 cu. ft. per minute, and is belt driven from a 90-hp. electric motor, which is controlled by an automatic device that starts and stops it when the air pressure drops or rises above certain predetermined limits. From the compressor the air passes to a large receiver, from which the air supply lines to the different parts of the shop radiate. Adjacent to the compressor, as will be seen from the layout diagram, is located a motor-generator set which transforms the 2300-volt alternating-current power supplied by the lighting company into 220-volt direct current for use in the motors around the shops. The machine shop is located near the compressor room, and this section of the bay is served by two hand-power cranes as well as a narrow-gauge track for convenience in handling the work.

The building will be heated by the blower system, the hot-air mains running above the rows of columns and having drops every 40 ft.

The Brier Hill Steel Company, Youngstown, Ohio, has placed contracts for two 1500 turbo generators with the General Electric Company, Schenectady, N. Y., and for 17 electric cranes with the Morgan Engineering Company, Alliance, Ohio. This equipment is to be installed in the open-hearth steel plant now under construction at Youngstown.

A New Type of Centrifugal Fire Pump

A recent development of the Goulds Mfg. Company, Seneca Falls, N. Y., is a new design of centrifugal fire pump which is built in accordance with the requirements of the Association of Mutual Factory Fire Insurance Companies. The outfit includes a pump, bedplate and all the fittings required by the fire insurance companies together with either an alternating or direct current electric motor or a steam turbine for driving the pump.



A Recently Developed Centrifugal Pump with Either Electric Motor or Steam Turbine Drive Built by the Goulds Mfg. Company, Seneca Falls, N. Y.

Four sizes of pump are built having capacities of 500, 750, 1000 and 1500 gal. per minute which will supply two, three, four and six streams respectively. The objects sought in the design of this equipment were ruggedness and strength, ample waterways and readily accessible parts together with simplicity and reliability of operation. To prevent any corrosive action from the water, all the working parts are made of bronze.

The unit illustrated is a 500-gal. equipment and with 250-ft. leads of smooth hose and 1⅛-in. nozzles, the pressure at the nozzle is 250 lb. per square inch, which gives an effective stream in a moderate wind at a hight of 70 ft., or a horizontal range of 63 ft. This pump is driven by a 50-hp. motor operating at a speed of 1700 r.p.m. The over-all dimensions of the complete unit are length, 115 in.; width, 75 in., and hight, 57 in.

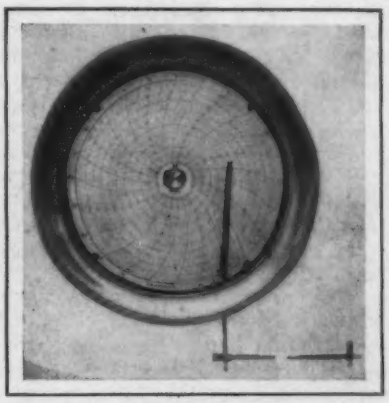
The New Castle Steel & Iron Company

The New Castle Steel & Iron Company, which was chartered some months ago with a capital stock of $100,000, has increased its capitalization to $400,000 and has bought under foreclosure of mortgage the plant of the New Castle Forge & Bolt Company, New Castle, Pa. The new owner will make a full line of bolts, nuts, rivets, chain and forgings, and will add equipment which will considerably increase the output of the works. It will also build shops for repairing cars and for building steel underframes. Plans for the additions are now in preparation and contracts for the new shops are expected to be placed in a short time. A considerable line of iron working tools will be installed. W. H. Schoen is president; J. D. Rhodes, vice-president; Andrew B. Berger, treasurer, and E. H. Brainerd, secretary. The directors include these officials and E. N. Ohl, G. P. Rhodes and J. S. Wilson, all of Pittsburgh, and R. C. Patterson and A. C. Hoyt of New Castle.

The F. B. Shuster Company, New Haven, Conn., is shipping to France an automatic wire straightener and cutter built to take wire from the coil and cut it to lengths of 67 ft. and shorter, the wire thus cut to be used for reinforced concrete flooring. This is stated to be the longest machine ever built. The longest machine previously built was one made by this company several years ago, which cut 32 ft. as its maximum.

Mechanical and Electrical Operation Recorder

A mechanical time or operation recorder which is also capable of being operated electrically has just been added to its line of recording instruments by the Industrial Instrument Company, Foxboro, Mass. This instrument is mounted in round form cases of the company's standard sizes and design so that when located on the gauge board it will be uniform with the other instruments. This device is designed for recording the frequency, duration and extent of a mechanical motion such as the opening and closing of gates, valves or doors, and in fact any operation of which such a record is desired.



A New Device for Recording the Frequency, Duration and Extent of Any Mechanical Operation Built by the Industrial Instrument Company, Foxboro, Mass.

The pen arm is attached to and supported by the shaft or axis in the same way as in the liquid level recording gauge which was illustrated in *The Iron Age*, February 1, 1912. An arm attached to the shaft passes through the case and an extension with an adjustable clamp serves to facilitate the adjustment of the available motion to secure the desired pen travel on the chart. A great variety of clock movements can be supplied, the time of revolution of a chart varying from 15 min. to 1 week, as desired. The clock movements supplied are of the standard type for revolving the charts for the generally used periods of time.

In addition to the mechanical device, one which is operated by an electric contact instead of mechanical motion is also made. This instrument consequently is adapted for use in many places where it is desirable to locate the recorder itself at a distance from the source of motion or operation. When contact is made the current actuates the armature to which the pen is attached and the chart records the frequency and duration of the contact. Any number of pens up to six are regularly supplied for these recorders.

Retort Charcoal Plant at Chocolay Furnace

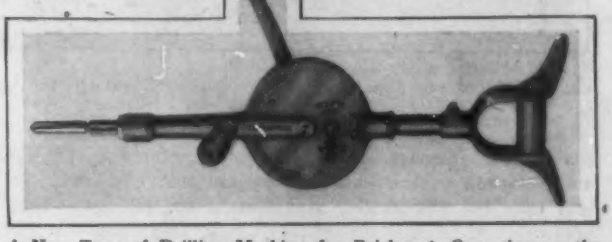
The Lake Superior Iron & Chemical Company, which in the past few years has made large outlays in improving its various plants, notably those at Newberry and Manistique, Mich., and Ashland, Wis., has adopted plans for a chemical works at its Chocolay furnace at Marquette, Mich. The projected plant will cost approximately $200,000 and will be similar to the wood distillation works erected last year at Newberry. The Chocolay furnace is idle and has been ever since it was purchased by the company several years ago, notwithstanding that it was rebuilt at an expense of upward of $100,000. The time when it will be put in blast depends upon developments in the iron market. At present its production is not needed. A principal improvement at the Chocolay plant when it was taken over was the building of fifty brick charcoal kilns, and it now seems probable that these will be discarded, and the retort system installed. By its use the hardwood utilized in the manufacture of charcoal gives up 100 per cent. more distillate than is possible with the kiln process. Where the distillate from a cord of wood formerly yielded but four gallons of alcohol and less than 100 lb. of acetate, by the retort system it will produce from 10 to 13 gallons of alcohol and 200 lb. of acetate. The retort process requires less than half the time for complete distillation that is required when kilns are used. While the retorts will not produce as much charcoal at one charging as the kilns, the product is better. The profits from wood distillation are large in comparison with the operating cost, figuring ten gallons to the cord.

A Quick Action Drilling Machine for Brickwork

For reproducing the same action in the drilling of holes in stone, brick or cement as is secured with the ordinary hand hammer and drill, the Diamond Expansion Bolt Company, 90 West street, New York City, has developed a new tool which is known as the Diamond rapid fire drilling machine. The speed of operation is much greater, however, as with every revolution of the crank at least eight sharp blows are struck. The action of the hammer upon the drill and in turn that of the latter upon the stone is identical with that produced in the old way, but it is emphasized that the best results were secured by comparatively light blows properly timed and struck and this theory has been taken advantage of in designing the new tool. As the number of blows struck varies from eight to twenty times that regularly delivered with an ordinary hand hammer according to the speed of rotation of the crank, a corresponding increase in the rapidity with which the holes are drilled is secured. It is claimed for the holes drilled with this machine that the bore is smooth and the edge is sharp, while danger of cracking the wall at the surface is done away with.

The action of the tool is percussive, and it is claimed that the mechanism is so constructed that practically no vibration or concussion is felt by the operator.

Another advantage is that the handles are so arranged that the tool can be adapted for use in any position. By loosening a screw underneath the D handle, it is allowed to rotate and may be used as a breast plate, thus permitting the drill to be rotated in the hole to insure clearance. When used in this position the forward handle is turned slowly backward and forward to give movement through an arc of about 45 deg., and thus prevent the drill point from binding in the stone.



A New Type of Drilling Machine for Brickwork Operating on the Hammer Principle Built by the Diamond Expansion Company, New York City

Standard drill points which are the same as those formerly supplied with the company's drill holder and points are used, and as the taper shanks on all sizes are identical it is possible to use them interchangeably. It is pointed out that the drill points used will remain sharp for a somewhat longer period of time than they would if held in a drill holder and subjected to the blows of a regular stone hammer.

There are three adjustments for the machine, which are controlled by a spring lever at the side of the housing. Two springs of different power are furnished with each machine, thus giving six variations to the force of the blow that can be delivered by the hammer. By removing the cover of the housing it is possible to change the springs easily without disarranging or unfastening any of the parts of the mechanism.

A map locating iron ore deposits, blast furnaces, lignite mines in operation and producing oil fields in eastern Texas has been published by the Bureau of Economic Geology and Technology of the University of Texas at Austin. Dr. William B. Phillips directed the compilation of the data. It was under his direction also that a geological map of a portion of western Texas, showing parts of Brewster, Presidio, Jeff. Davis and El Paso counties was published in 1904, based upon the United States Geological Survey's topographic sheets and reconnaissance maps covering this area.

The Penn Iron Company, Ltd., Lancaster, Pa., manufacturer of bar iron, etc., is repairing its plant, which has been idle since July 1, 1911, expecting to resume operations shortly.

Foundry Heating and Ventilation*

A Discussion of the Points to Be Considered in the Solution of This Problem

BY W. H. CARRIER.†

Manufacturers in general realize more today than ever before that one of the greatest assets of a business as an efficiency producer is the proper and adequate heating and ventilation of the workrooms, foundry, machine shop and offices. The problem of heating the machine shop or office is not to be approached from the same angle as

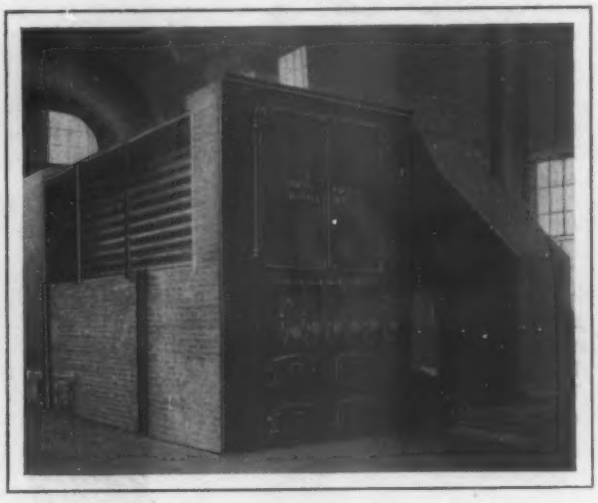


Fig. 1—One of the New Type of Fan Heaters Developed by the Buffalo Forge Company, Buffalo, N. Y.

that of the foundry. The features governing the design and selection of the foundry heating and ventilating system may be enumerated as follows: 1. Desirable temperature. 2. Even distribution of heat, including the prevention of cold drafts and the economical application of heat to avoid the radiation of heat out of doors and the overheating of unoccupied spaces. 3. Ample ventilation when needed. 4. Rapid heating up of the building in the morning. 5. Cost of installation, and, 6. Economy of operation and maintenance.

The desired minimum temperature in a foundry depends largely upon the nature of the work, mill work requiring a higher temperature than heavy work where there is considerable physical exercise. In general, however, the temperature required in the foundry is from 5 to 10 deg. lower than that which would be suitable for a machine shop, so that the desirable temperature lies between 50 and 60 deg. Fahr., 55 deg. being taken as a good general average.

The proper distribution of heat in the foundry is comparatively difficult. In general, the problem is that of a large open space, affording little opportunity for efficient placing of direct radiation pipes. On account of the usual monitor type of building employed the hight is relatively great. The hot air rises into the lanterns and out through the ventilators if fans are not provided to keep it down near the floor. The heated column of air in the building acts like a chimney, drawing cold air from without at every opening. This tendency to inward leakage of cold air not only demands a great amount of heat, but makes a thorough distribution of heat at the floor line most essential to comfort and economy of operation. A slight plenum or outward leakage of warm air at these doors and openings, caused by the delivery and proper distribution of sufficient heated air into the building, is the only solution of this difficulty.

The lantern type of building is best adapted to quick ventilation, since the ventilators simply have to be opened and the hotter and lighter gases and vapors will rise and pass out. The fact must be considered, however, that air is bound to come from somewhere to take the place of the air passing out through the ventilators. Cold air coming in through doors and openings will tend to cool off and condense the rising vapors to an even more serious and clouding extent. It is therefore essential that a system be installed which delivers fresh warm air during the pouring period when ventilation is of prime importance.

Rapid heating up of the building in the morning means that the best efficiency from the men will be obtained over the entire working period. A system which is elastic and capable of rapid and accelerated results is to be favored.

Coke or gas fired salamanders are apparently the most economical form of heating, as all of the heat goes directly into the building. The atmosphere in a tightly closed building heated by this method, however, soon becomes intolerable, and if sufficient ventilation is provided to make conditions healthful, then the amount of heat required is greater than with other systems. The grade of fuel required is also considerably more expensive than any other system of heating, to say nothing of the care of a large number of separate fires scattered around the building. When heating with direct radiation, steam is usually employed, although hot water systems with forced circulation have been successfully operated. Unless there is a large amount of hot water available, this system is not an economical one to install on account of the greatly increased amount of radiation which is required at a lower temperature. In steam heating either the high pressure, the low pressure or the vacuum system of distribution is employed, the selection of the particular one being dependent upon local conditions. Where high pressure steam is available and there is no exhaust steam, the first system should be used, because steam at 100 lb. gives approximately 75 per cent. more heat per square foot of radiating surface than steam at 5 lb., because of its higher temperature. If neither high pressure nor exhaust steam is available from the power plant, then an independent low pressure boiler should be installed to furnish steam at from 5 to 10 lb. pressure. For low pressure work cast-iron boilers may be used and no boiler feed pumps are required. The boiler should be placed at a level so that the condensation will drain back by gravity. If this is impracticable, then a gravity system may be

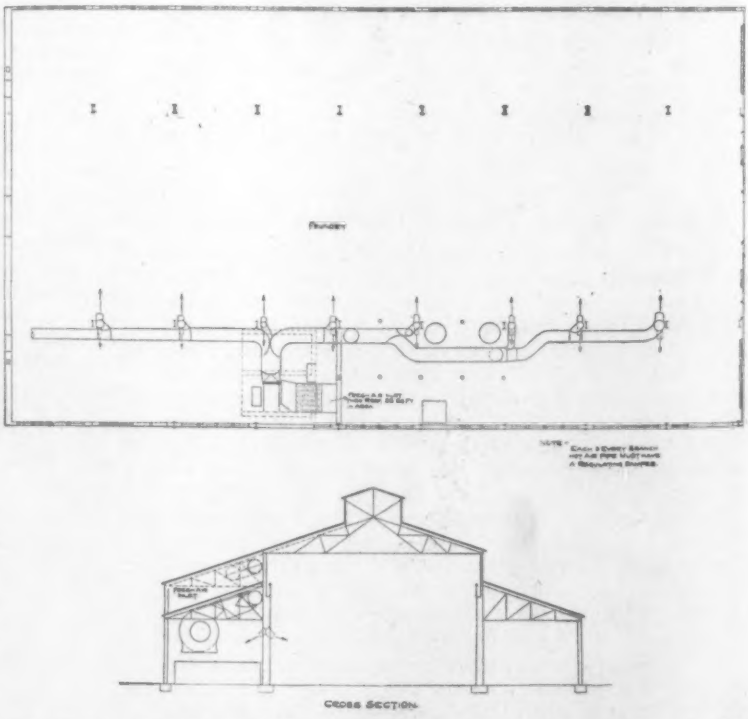


Fig. 2—Plan View and Cross-Section of a Foundry in Which the Air Ducts Are Run Down the Column

*From a paper read before the recent meeting of the American Foundrymen's Association at Buffalo, N. Y.

†Chief engineer, Buffalo Forge Company, Buffalo, N. Y.

employed by using a centrifugal pump to raise the water level to that of the boiler. A vacuum system should always be used when exhaust steam from the power plant is available. In this type of distribution system the back pressure should not exceed 1 lb., as otherwise the power of the engines will be reduced or their steam consumption increased.

Probably the most satisfactory method of arranging the radiation is that of mitre type coils placed along the outside walls between the windows, the main length of the pipe being placed vertically to avoid accumulation of dust and to obstruct the side walls as little as possible. Several rows of pipe are also run along the side wall of the monitor roof, just above the crane, to provide for the radiation of heat through the roof and skylights and to prevent cold down drafts which would otherwise occur. While this distribution is not efficient it is the only practicable one in this type of building.

The best system for foundry heating and ventilation is the fan system, and it is particularly adapted to the severe requirements of foundries and other buildings of similar construction where there are large open spaces to be heated. The principal advantages of the fan system over the use of direct radiation are: The thorough distribution of heat secured by discharging the air under pressure through suitable outlets, less waste of heat, rapid heating up in the morning, the giving of a rapid warm change which removes smoke, steam and dust during pouring times and lower installation and maintenance costs.

Steam or hot water can be used in the fan system heater coils the same as with direct radiation. The fact that cool air is drawn over these coils by the fan makes it possible to obtain a great deal more heat from the same amount of heating surface, which in turn cuts down the necessary radiation surface by about two-thirds. Frequently the fan is driven by a direct-connected steam engine, the exhaust from this engine being used in the heater coils. This is a very economical procedure, as practically every heat unit of the steam is thus utilized.

The Buffalo Forge Company has developed a new form of fan system of heating, which is known as the direct-air furnace system. Instead of burning coal, gas or oil under boilers, developing steam, transferring the steam from the boilers to the heater coils through a considerable run of pipe and finally giving up the heat to the air from the heater coils, this system transfers the heat of the burning fuel directly to the distributed air. An efficiency of 85 to 90 per cent. has actually been obtained as against the usual 50 to 60 per cent. resulting from steam boiler operation. Numerous installations using gas for fuel have been made and recently a system using powdered coal has been installed. The construction of the furnace is similar to a horizontal water tube boiler. The hot gases pass through the tubes and the circulating air is drawn around the tubes by the supply fan, heated and distributed. Fig. 1 is an illustration of one of these furnaces installed at the plant of the American Rolling Mill Company, Middletown, Ohio.

The hot air ducts from the fans are usually of galvanized iron, carried overhead in the roof trusses. When these ducts are placed at a hight not exceeding 20 ft. the air may be delivered directly into the building through short outlets. The design of these outlets is of particular importance to the success of the system. The velocity must be properly proportioned to the hight, the size of the outlet and to the horizontal distance which the air is to be blown. The greater the distance and the hight above the floor and the smaller the outlet, the higher the velocity must be to obtain the proper distribution. If, on the other hand, the velocity is excessive for these conditions, objectionable drafts will be produced. In certain cases the main piping may have to be placed too far above the floor to permit good distribution of the heat at the floor line with short outlets. In such cases it is usual to provide drop pipes from the main pipe at the columns or along the side walls. Where the former arrangement is employed, each pipe has generally two branches, one blowing toward the base of the windows at the side wall, and the other toward the center of the building, as is shown in Fig. 2. Where the drop pipes are extended downward at the side walls it is usual to provide three outlets to each drop pipe, two blowing along the walls, and the third blowing outward toward the center of the building. In wide buildings it is usual to run two lines of pipes along the columns on each side instead of the arrangement illustrated in Fig. 2, which applies to narrow buildings.

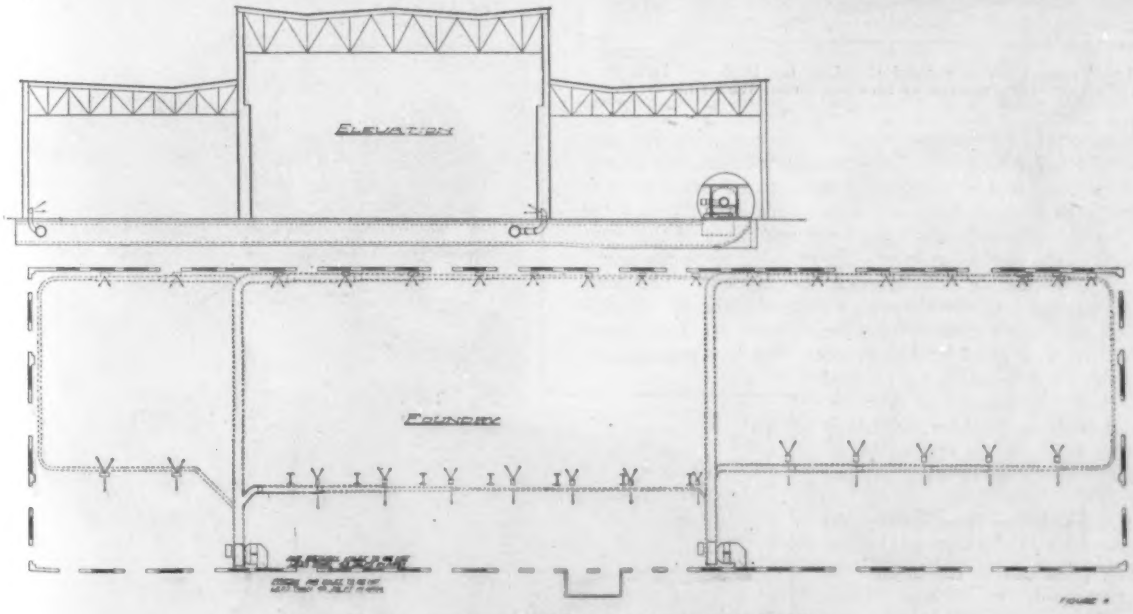


Fig. 3—Arrangement of Ducts in a Very Wide Building

A neat though more expensive system of distribution is with underground main ducts and galvanized-iron vertical risers arranged along the columns or side walls, or in some instances, as in the case of particularly wide buildings, at both places, Fig. 5 being a typical example of an installation of this character. The system of outlets in this case will be practically the same as where drop pipes are used.

The fans can be either motor or engine driven. If there is plenty of exhaust steam available for use in the heater coils the former will be found economical and satisfactory, and is also preferred by many on account of the great simplicity of operation and the little care and attention needed. With small fans it is good practice to connect the motor directly to the fans, but on larger apparatus the speed of operation is so low as to make it advisable to use belt drive on account of the high cost of slow-speed motors.

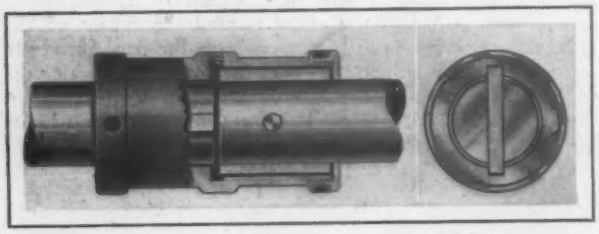
Engine-driven fans are advisable when moderately high pressure steam is easily available. The steam can first be used to drive the fan and then the engine exhaust used in the heater coils. This procedure is exceedingly economical, since practically every heat unit of the steam

is utilized. The power used to drive the fan is almost negligible, as the engine is really nothing more than a pressure-reducing valve. The speed of operation with the engine drive is also much more flexible, thus permitting a wide range of speed as may be required by different weather conditions.

From the standpoint of cost, the direct radiation and the fan system are practically the same to install. The power necessary to drive the fan in the fan system might seem to be an extra item of expense, but it is, however, more than offset by the more efficient distribution of the air which cuts down the losses and necessary radiation surface materially. The total operating expense of the two types of systems varies very little in the long run.

An Improved Flexible Steel Shafting Coupling

A new type of flexible coupling which is made entirely of crucible cast steel has been developed by McEwen Bros., Wellsville, N. Y. The special features characterizing the design of this coupling are the small diameter and the



A New Type of Flexible Steel Coupling for High and Low Speed Shafting Manufactured by McEwen Bros., Wellsville, N. Y.

little amount of clearance required for removing any part. The field for which this device is adapted includes blower, rotary pump, motor, generator, turbine and lineshaft connections as well as for machinery operating at any speed.

The exceptionally small diameter and mass of the coupling gives the device an inertia that is said to be the smallest of any flexible coupling on the market. The keys, which extend entirely through the shaft, are set at right angles, and are arranged to permit departure from exact alignment to a considerable extent. The key bearing surface is ample and it is pointed out that by reason of the lubrication from packing of heavy oil or soft grease there is no noise or tendency toward serious wear.

Before being placed on the market the coupling was thoroughly tried out by the builder on its turbine-driven pumps, which were illustrated in *The Iron Age*, August 8, 1912. During this test the experimental couplings were in service 24 hr. per day for a number of months. In addition to this test, which was made at a high speed and under severe conditions, the coupling has also been tried out in connection with a reversible-motor drive for machine tools.

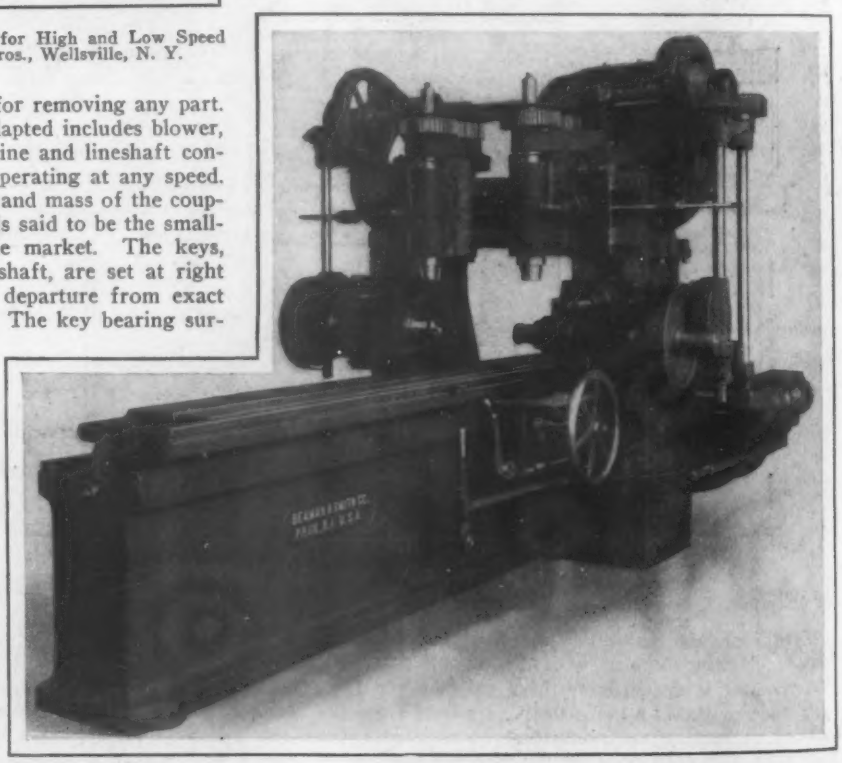
The natural gas companies in and about Canton, Ohio, having cut off the supply of natural gas to large manufacturers, the Canton Steel Foundry Company has turned its 25-ton open hearth furnace over to fuel oil, using for this purpose the equipment of Tate-Jones & Co., Inc., Pittsburgh, Pa.

Dean Hermann Schneider, engineering department of the University of Cincinnati, announces a change in the co-operative course for students. Hereafter, instead of spending one week alternating from school to shop, students will work two weeks and attend college two weeks. Exhaustive experiments made indicate that the new plan adopted will tend to be of mutual benefit to both the student and manufacturer.

A New Four-Spindle Milling Machine

The Beaman & Smith Company, Providence, R. I., has developed a new type of four-spindle milling machine. The machine follows the standard practice of the company as regards the general construction. Positive geared feed is provided for the table and the machine has an adjustable-speed motor drive. Briefly the machine consists of a bed supporting a work table and having two uprights attached to it. These uprights in turn carry a cross-rail upon which the two vertical spindles are mounted, while the two horizontal ones are mounted one on each upright. All of these spindles are adjustable, the vertical ones having a horizontal movement on the cross-rail, while the horizontal ones have a vertical movement upon their respective uprights.

The table is operated by a screw in a revolving bronze nut throughout its movement of 129 in. on the bed, the thrust being taken by ball bearings. In addition to this adjustment on the bed the table also has a quick power movement of 10 ft. per minute in either direction, together with automatic stop and feeds which are arranged to maintain the desired rate constant at any spindle speed. There are nine feed changes available. These range from 1 to 12.3 in. per minute at a driving shaft speed of 500 r.p.m. and are secured through gearing contained in a conveniently located feed box, the change from one rate to another being easily and quickly obtained. The work surface of the table measures 17 in. wide by 10 ft. long and has three T slots finished from the solid and two rows of stop pin holes.



A New Type of Milling Machine with Four Spindles Built by the Beaman & Smith Company, Providence, R. I.

The crucible steel spindles run in hard bronze boxes and have a maximum independent adjustment of 6 in. The ends are tapered 3¼ in. in diameter for face milling cutters and have No. 12 Brown and Sharpe taper holes for cutter shanks and arbors. There is a hole through the center of each spindle for a retaining bolt. All of the spindles are driven in unison, gearing in the ratio of 7¾ to 1 giving a speed of 66 r.p.m. for the vertical spindles, while the horizontal spindles are driven at the rate of 23 r.p.m. through gearing in the ratio of 21¾ to 1.

As illustrated in the accompanying engraving, the machine is driven by an adjustable-speed 10-hp. motor having a range of from 500 to 1500 r.p.m. The power from this motor is transmitted to the driving shaft through gearing having a ratio of from 3 to 1. If desired the machine can be constructed to be driven by a 5-in. belt on a three-step cone pulley, the diameters of the steps ranging from 11½

to 16 in. When the machine is belt driven the countershaft has tight and loose pulleys 14 in. in diameter and running at a speed of 360 r.p.m.

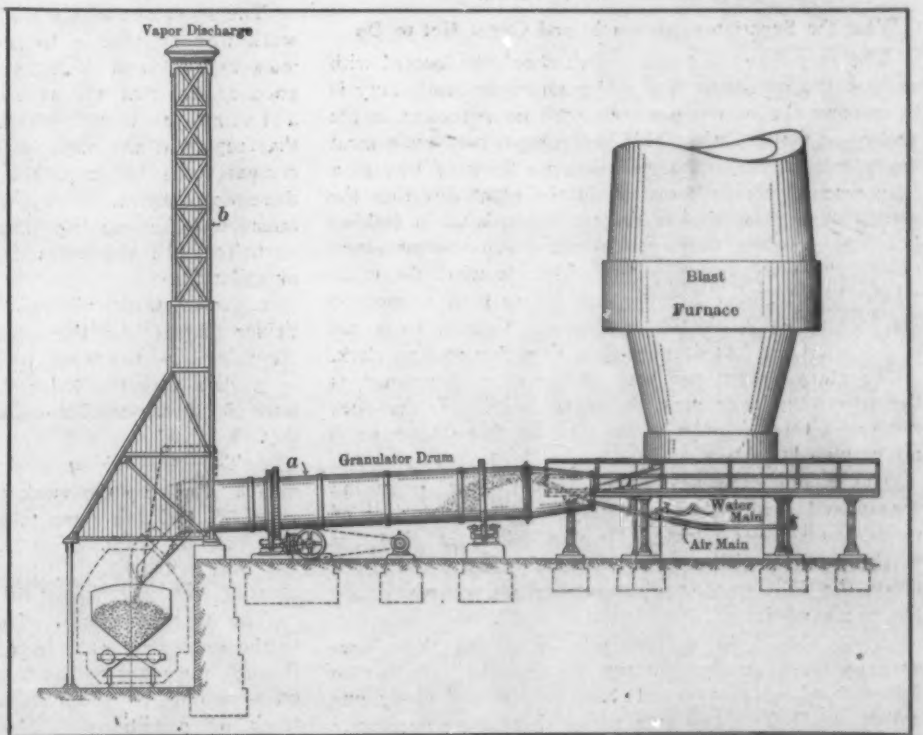
The following table gives the principal dimensions and specifications of the machine:

Distance between uprights, in.	30
Minimum distance between vertical spindle ends and table top, in.	9
Maximum distance between vertical spindle ends and table top, in.	15
Minimum distance between vertical spindle centers, in.	10¾
Maximum distance between vertical spindle centers, in.	30
Minimum distance between horizontal spindle centers and table top, in.	4
Maximum distance between horizontal spindle centers and table top, in.	10
Minimum distance between horizontal spindle ends, in.	6
Maximum distance between horizontal spindle ends, in.	18
Approximate weight, lb.	20,000

Air-Granulation of Molten Slag

A German Plant Which Delivers the Product Dried and Cooled Ready for Use

A method of granulating slag by which the granulated product is delivered dry and cool is described in the London Iron and Coal Trades Review of October 18, 1912. The plant illustrated herewith was erected at the Buderus Iron Works, Wetzlar, Rhenish Prussia, and was designed by G. Jantzch, the works manager. The slag channel from the blast furnace projects into an inclined rotating iron drum *a*. Beneath this is a blast pipe terminating in a wide nozzle directed against the stream of molten slag flowing out of the channel. In this manner the slag is sprayed and immediately thrown against the shell of the rotary drum or propelled in the direction of its axis. The slag particles thus move over a large portion of the cooling surface of the drum, which can be cooled wholly or partly by spraying water on the outside. Owing to the rotation of the drum, a fresh surface is constantly presented for the slag to impinge against. The slag in traveling through the drum, which is fitted with scoops, is continually turned over and exposed to the current of air, so that the particles, as they leave the drum, have the consistency of sand and are sufficiently cool for immediate removal by mechanical means. This sand does not contain any lumps or caked masses of slag, but consists of loose grains not exceeding the size of cherry-stones.



Apparatus for Air-Granulation of Molten Slag as Used at the Buderus Iron Works, Wetzlar, Rhenish Prussia

In the installation in question, the granulated slag sand falls directly from the revolving drum into a bucket elevator, which conveys it into a storage bin, whence it is transported by an aerial railroad to the cement works. But the sand might equally well be charged into railroad cars, as shown in the illustration. The lower end of the revolving drum and the elevator pit are in an entirely covered space provided with a chimney *b* to carry away the fumes resulting from the granulating process, to a sufficient hight to prevent them being a nuisance to the neighborhood. In order to prevent the formation of slag wool in the slag, means are provided for moistening the current of air used for spraying the slag, as may be required.

Air-granulation of molten slag by this method has been continuously employed at the Sophienhütte Works of the above company for over a year, with a daily output of 100 tons of slag sand of the kind described. With a drum of 72 in. diameter by 50 ft., the capacity depends only on the quantity and pressure of the current of air employed, which has been taken so far from the blowing engine. The revolving drum and the bucket conveyor require about 8 to 9 hp.

In order to ascertain whether dry granulation produces the same hydraulic properties of the slag as water-granulation, Dr. Passow, of Blankenese, Rhenish Prussia, has carried out tests with the result that the slags poor in silica give the best values as regards strength, yet, quite apart from the amount of silica content, the dry-granulated slags give at least the same strength values as the water-granulated slags. Also attempts to utilize the air-granulated slag as fine-grained material for concrete aggregates have given good results. It has advantages when further treated for the manufacture of cement, since there is a saving in fuel labor and expensive drying apparatus, so that the installation and working of a cement works will be considerably simplified.

Cincinnati Metal Trades Entertainment

The Cincinnati Branch, National Metal Trades Association, has inaugurated a series of entertainments for the benefit of members and their employees. The first of these was held at Music Hall on the evening of November 12, with an estimated attendance of over 3500. J. M. Manley, former secretary of the Cincinnati Branch, introduced the speakers.

H. B. B. Yergason, of Rogers, Brown & Co., pig iron merchants, gave a lecture on "From Mine to Molder," showing the series of moving pictures taken under his supervision that have attracted so much attention in other parts of the country. He was followed by W. H. Doolittle, who urged a closer co-operation of employees with employers in the prevention of factory accidents. Secretary William S. Dickson arranged the programme. The interest taken at the initial entertainment has induced the association to announce that similar meetings will be arranged for the near future.

The Lyons-Atlas Company, Indianapolis, Ind., successor to the Atlas Engine Works, will enlarge its line by the manufacture of six-cylinder motors. The Knight engines previously produced have been four cylinder, with 4½-in. bore and a stroke of 5½ in. The plant will turn out 4000 motors in 1913.

The Massillon Foundry & Machine Company, Massillon, Ohio, is installing 12 drop hammers, ranging in size from 800 to 2500 lb., in the new plant of the Dominion Stamping Company, Ltd., Walkerville, Ont., Canada.

The Duties of the Factory Superintendent*

How He Ought to Study Details of Department Operation—Graphical Production Records and Their Use to Secure Co-operation

BY STUART DEAN

Full authority should center in a works manager or superintendent. He should be a member of the firm. Many a company has come to grief because it did not have a practical man in the firm, but depended on hiring its practical knowledge.

The superintendent's office should be located at the most prominent point in the works, so that he will be very accessible to every one. "The master's eye enricheth the soil." If he locates himself off in the main office many important matters about the works that he should be informed of will never be brought before him. The men will say to themselves: "I will tell 'Super' the next time he comes around," but by that time the whole matter is entirely forgotten. The superintendent's office should be of glass and should be considerably raised so that he can look over the whole shop at a glance. Papers on his desk cannot be seen by any one standing outside if his office is raised.

What the Superintendent Ought and Ought Not to Do

The shop-material routing clerk should be located with or near the superintendent. The superintendent's duty is to increase the output per man with no reduction in the quality of the product. This is the superintendent's most important duty. I am afraid that we think of him as a busy man at his desk or out in the plant directing the work, asking how this is getting along, what is lacking here, etc.; pushing those jobs forward that the customers are in the greatest hurry for. This is what the office would like to have him do, and there is a temptation for him to do it. When he does so, though, he is out of his place; he has dropped to a $2 a day routing clerk.

To study output per man and quality of product is the superintendent's most important work. If he does not spend three-fourths of his time on this subject he is not earning his salary.

1. The superintendent should be a faddist on cutting speeds and feeds and the number of cubic inches of metal removed per minute. He should keep in mind that at the point of the cutters and in the fixtures that cut down the idle moments between cutting operations lie the firm's profits.

2. He should be everlastingly correcting the allowance of finish on the patterns, so that the rule can be followed of taking two cuts and only two, for any one operation. Taking two cuts where three were previously permitted will cut one-third off the machining time.

3. He should be constantly studying the design of his company's product, changing it to eliminate labor in manufacturing. The brains of the concern should be kept on this work as much as possible.

How He Keeps Track of Production

A complete itemized set of reports, to be presented in these pages later, that give in detail the amount of work turned out by each department and by each class of men in each department, should be handed to the superintendent on the first of each quarter. These reports will enable him to catch immediately a dropping off of output per man in any department, and to correct the trouble. From these reports he will know which are his best foremen—the ones to be shoved ahead.

The superintendent should give all his orders in writing, keeping a copy of each for follow-up. He can never assume that his orders will be carried out without being followed up, nor must he try to depend on his memory for his following-up system. A good system is for him to have a spike file on his desk on which he sticks copies of all hurry-up orders. The first thing each morning he goes over these orders with his assistant, who tells him which orders have been carried out and which not, and the reason why not.

All notes that refer to orders that need not or cannot be attended to immediately he will file in one of three pigeon holes; one marked "First of Month," one marked "Fifteenth of Month," and one marked "First of the Quarter." Filing in these three places for future reference is a better way than filing in a daily tickler, as the notes are brought up only on certain days far apart. The superintendent thus keeps clear of this clerical work on all other days.

The Superintendent's Daily Routine

The superintendent must keep in mind that all clerical work that he attends to is dead loss to his firm. He must look at it in the light of a necessary evil. A very good system that will save him time is to carry around a folding partitioned pocket book with divisions in it that represent the various factory divisions. Into these compartments he drops the notes referring to work in these departments. Everything in the plant can then be attended to in one trip through the plant.

1. Take all the notes for the day from the tickler or spike file.

2. Assort them, placing those in the pigeon holes or tickler that are for the future, and those for the day in the folding pocket book, to be taken around the plant.

3. Pass over the order sheets to the shipping department for those machines that are to be shipped on the day.

4. Take the folding pocket book through all departments. Rush up the work that is lagging back.

5. After this is done take up the desk work and the new original work.

Systematizing for the Daily Investigations

The superintendent's range of eyesight being limited to the small area of a few feet around him as he walks through the plant makes it necessary for him to depend on something more far-seeing than his eyesight to keep track of conditions in the plant. These department records give him this insight to all conditions. They are a continual watch over the whole plant.

Each day the assistant superintendent should ask the machine foreman:

1. What troubles are you having from faulty foundry work, or bad material?

2. What fixtures and appliances do you need to carry on the work in a better way?

3. On what castings could the amount of finish be reduced?

He should ask the assembling foreman:

1. What troubles are you having with the work from faulty workmanship or material?

2. What pattern changes or changes of design could be made to eliminate assembling?

3. What parts are lacking to complete the erection of machines now being assembled?

The answers to these questions should be given to the superintendent each day in order that he can take up the matter with the proper parties. If this is done each

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day it will make a material difference in the profits at the end of the year.

The assistant superintendent should keep copies of the record cost cards of all the parts of the popular-sized machines that the firm turns out. All new cost cards he will compare to the master cost cards. Any falling down will require an explanation from the foremen. Particular cases he will report to the superintendent.

Supplying Material and Tools to the Machine

To turn out work with the least loss of time it is important to have a full week's work ahead at each machine tool; otherwise, the rate of output will drop. It is impossible to handle the supply to the machines to such a nicety that one can get along with less. Crowd together the machines which work on small pieces. Leave plenty of space around the machines which do large work.

There should be a card or order system at each machine which will tell the workmen what his next job is and what is the job that follows it. He will then be able to reduce the idle shut-down time of the machine between jobs. He can plan his work, get his drawings, get his tools, straps, bolts, etc. If there is a fixture or jig he can get this from the toolroom, and he can get the piece itself ready to put into the machine. If there is anything wrong with the tools or jigs there will be time to have them repaired.

A good system is to have a row of hooks on a board at each machine and hang the orders on these hooks in the order that the jobs are to be done. The system can be elaborated. The assistant machine foreman can pass from machine to machine and hang different colored tags over the orders, signifying whether the tools and fixtures are all in condition for the job, or whether they need grinding or repairing. A white tag hung on an order would mean that the casting or piece is at the machine and the tools are all ready to carry out the work. A red tag would mean that the casting is at the machine but that the tools for the job are in the toolmaker's department being ground or repaired. A blue tag would mean that the casting or piece is at the machine, but the tools have not been inspected as yet to see that they are in fit condition to carry on the job. No tag hanging over the order slip would mean that the casting or piece has not yet arrived at the machine, although it is expected.

If such a system is carried out the workmen can take the very best advantage of his work. He will be able to use some of his loafing time advantageously to the firm, and this will show at the end of the year in increased plant capacity and profits.

Information to be Kept in Graphical Form

The superintendent should use graphic diagrams for as many of his tables as he can. They present a picture of conditions in a most comprehensive manner where mere tabulated figures fail. These graphic tables should be in a loose-leaf book so that extensions can be made. In this book he should have the following, shown graphically. They should go back as far in the history of the firm as he can get the information:

1. *Pounds Shipped.* Pounds of finished machines shipped by the firm each quarter of a year.

2. *Total Hours.* Total hours put in by the workmen each quarter.

3. *Machine Hours.* Machine department hours quarterly.

4. *Erecting Hours.* Erecting department hours quarterly.

5. *Pattern Hours.* Pattern hours quarterly.

6. *Foundry Hours.* Total foundry hours quarterly.

7. *Non-Productive Hours.* All hours quarterly not taken care of in 3, 4, 5 and 6.

Divide the number of pounds in the first table by the hours in each of tables Nos. 2, 3, 4, 5, 6, 7. The quotients give the number of pounds of finished machines that each man's labor helps to turn out per hour. Multiplying this by the hours in the work day gives the pounds of finished machines manufactured for each man's day's labor. This gives the following graphic diagram tables:

Suggested Tables of Labor Production

8. *The Whole Plant.* The number of pounds of finished machines each man each day, all over the plant, helps to turn out.

9. *Machine Man.* The number of pounds of finished machines each machine man turns out per day.

10. *Erector.* The number of pounds of finished machines each erector turns out per day.

11. *Pattern-maker.* The number of pounds of finished machines being made for each day's work of a pattern-maker.

12. *Foundryman.* The number of pounds of finished machines manufactured for each day's labor in the foundry per man.

13. *Other Help (Non-Productive).*—The number of pounds of finished machines manufactured per man for each day's labor of help other than already enumerated.

From tables Nos. 8, 9, 10, 11, 12 and 13, especially from 9, 10 and 13, the superintendent can see exactly what improvement each foreman is making in his department. The superintendent can command the ones that have made progress and give a ginger or booster talk to those whose showing is poor.

The same system of tables can be worked out on the basis of the proportion of the wages to the output, thus: 14. Quarterly pay roll. 15. Machinemen's pay roll quarterly. 16. Erecting men's pay roll quarterly. 17. Pattern pay roll quarterly. 18. Foundry pay roll quarterly. 19. Quarterly pay roll for the non-productive labor or all help not already covered.

Suggested Tables of Labor Cost of Product

Divide the pay roll in each of the above groups of employees (to 19 inclusive) by the number of pounds of finished machines shipped, No. 1, and multiply by 100. The result gives the pay roll-cost in each department for 100 lb. of finished machines shipped. We take 100 lb. rather than 1 lb. as a basis for the tables because it gives a larger figure for the result, and any small change from quarter to quarter will be more noticeable. This gives us the following tables:

20. Total plant labor cost for each 100 lb. of finished machines.
21. Machine labor cost for each 100 lb. of finished machines.
22. Erecting labor cost for each 100 lb. of finished machines.
23. Pattern labor cost on each 100 lb. of finished machines.
24. Foundry labor cost for each 100 lb. of finished machines.
25. Non-productive cost on each 100 lb. of finished machines.

Suggested Tables of Foundry Operations

The separate divisions of the foundry should be watched by tables based on monthly records instead of quarterly ones, as follows:

26. Total number of pounds of castings reported made by the foundry.

27. Number of pounds of castings thrown out by the machine shop due to bad foundry work. These are to be deducted from the castings in table No. 26 and give table No. 28.

28. Number of pounds of good castings made by the foundry.

29. Number of pounds of iron charged into the cupola.

30. Number of pounds of scrap from the foundry (sprues, risers and castings that turned out bad in the foundry). The figures had better be gotten by a process of elimination rather than by direct weighing. Take from the total scrap charged into the cupola the amount of scrap obtained from the machine shop plus the bought scrap. This gives the scrap that came from the foundry.

31. Number of pounds of castings the foundry should have reported as made barring the loss of iron in the cupola, the dump and shot iron in the foundry and clean-

ing room, the figures being obtained by subtracting the figures of No. 30 from those of No. 29.

This cycle of foundry weight tables can be used as a check on the weighing and is valuable in keeping the weight men accurate. If they know that you have a rough check on them they will be careful. The following men are checked. The man who weighs bought scrap iron; the man who weighs castings thrown back from the machine shop; the men who weigh the castings made by the foundry, and the man who weighs the charges for the cupola. I know of a case were this system of checking discovered the crookedness of a foundry foreman, who was sending in reports of weights of castings made by the foundry higher than the actual amount so as to make the casting cost appear low.

Further subdivisions may be made as follows:

32. Total foundry hours.
33. Total molders' hours.
34. Hours foundry helping.
35. Hours casting cleaning.
36. Hours core room.

37. Hours of other foundry help (crane men, cupola men, foremen, etc.).

Dividing the weight in table No. 28 by the number of hours in tables Nos. 32 to 37, inclusive, and multiplying by the number of hours in the working-day, gives the number of pounds of castings worked on or helped on for each day for each man in any of the groups of men in the foundry. This gives the following tables:

38. The day's output of each molder.
39. The number of pounds of castings each foundry helper helps on each day.
40. The number of pounds of castings each casting cleaner cleans each day.
41. The number of pounds of castings a day each man in the coreroom makes cores for. In this table the coreroom helpers and foreman are not separated from the core-makers as it would be a useless refinement.
42. The number of pounds of castings turned out per day per capita of all other help (cupola, crane and foundry foremen).

The same system of tables can be worked out on the basis of wages, thus:

43. Total foundry pay roll, including in this the pay roll of No. 48.
44. Total molders' pay roll.
45. Helpers' pay roll.
46. Coreroom pay roll.
47. Crane, cupola and foremen's pay roll.
48. Pay roll spent in other departments for doing foundry repair work.

Dividing the pay roll amounts in Nos. 43 to 48, inclusive, by the weights of good castings turned out (No. 28) and multiplying by 100 gives the labor cost on 100 lb. of good castings made by each man each day in any one group of men. This gives the following:

49. Total labor cost on 100 lb. castings.
50. Molding cost per 100 lb. castings.
51. Helping cost per 100 lb. castings.
52. Core cost per 100 lb. castings.
53. Crane, cupola and foremen labor cost per 100 lb. castings.
54. Foundry repair labor cost for each 100 lb. of castings.

These graphic tables are not so much work to take care of as would seem at a glance, for with the exception of the foundry they come up quarterly only. This information is laid on the superintendent's desk by the bookkeeping and cost-keeping departments in sheet form.

Down the left-hand edge of each of these sheets are given the names of the items. The amounts are placed in columns at the right of the items. The sheets have spaces for each of the four quarters of the year, for the total year and for the previous year, the items being reduced to the quarterly rate, so that comparisons can readily be made.

The superintendent should transcribe these items to his graphic-diagram loose-leaf book with his own hand. This will bring the various changes of conditions throughout the plant home to him in a much stronger way than if his assistant transcribed them. From these graphic reports the superintendent can catch the slipping backward of any department before it has gone too far.

Securing Cooperation of the Foreman

A foreman who is a genius will improve his record in the face of a change in the class of work that requires increased labor per pound of product. The graphic table line will continue to climb.

It is a splendid idea to give each foreman a quarterly written statement of the number of pounds of finished work his department averages per work day per man. This acts as a spur to the foremen. The foremen take the keenest interest in these reports. To them the reports are a tangible statement which they can compare with their records of previous years. These reports keep reminding them that any hours wasted will injure their record. A lazy man, a man who spoils work, or a slow man will not be tolerated, because such men increase hours without increasing the pounds output.

The foremen will call the superintendent's attention to faults that hold the work back, such as ill-shaped castings, requiring hand-chipping; too much finish allowance by the pattern shop, obliging the machine department to take three cuts where two would have been enough, or inaccurate work from preceding departments which consumes time in correction. I remember a machine foreman's remark when forced to throw away a casting that had turned out bad after machining. "Look at my hours being thrown into the scrap box!" One foreman was so interested in his report that he always carried it around under his work cap.

Department Watching

Once every two years, or if he can see his way clear to do it once every year, the superintendent should spend a full month in each department. He should get there at whistle time in the morning and stay in the department until the close in the evening, every day, criticising and making improvements. He should let everything else drop and take up one department at a time in this way.

Of course the average superintendent will say: "Oh, this is absolutely impossible. I have my regular duties to perform each day." What are these regular duties? They are all mere clerical duties which he should not be doing at all.

The superintendent should know how to use an assistant and should throw all simple work and statistical work upon him. This will leave the superintendent free to do original work and improvement work. The assistant must have an absolutely accurate mind. He must be fearless in pressing the work forward that the superintendent wishes done.

His next question will be, "What will become of the work in the other departments if I never go into them for a month?" He can take them up some following month and really do some good in them. The improvement that the superintendent makes in a department by walking through it a few times a day, superficially looking it over, is practically nothing. He can tell nothing about the detail way they run except by staying in the department all day, each day, for a month. The things that he will straighten out by doing this will make an enormous profit at the end of the year.

Remember the average machine shop only turns out 30 per cent. of its possible capacity. This leaves 70 per cent. to be worked on. I know a plant where the superintendent's adopting this system increased the output per man and reduced expenses in all departments. In the foundry alone the cost of castings dropped from 3 cents to 2¼ cents per pound. This meant that he sacrificed his $2.50 per day clerical duties and his occasional walk through the different departments which were always on dress parade during the time he was in the department. Is there any excuse or reason for paying 3 cents per pound for castings when a 2¼-cent cost can be gotten by having the superintendent spend all his time in the foundry for one month in a year?

System in the Storage of Patterns

Method Adopted by the Standard Sanitary Mfg. Company, Louisville, Ky.

When the storage arrangements of the 25,000 patterns used in the business of a large plant are left to the devices of an unskilled and not too intelligent laborer, and when the location of any one of the 25,000 is recorded only in his overtaxed brain, and can be found solely by the aid of his memory, confusion and delay are likely to result.

This was discovered by the Standard Sanitary Mfg. Company, operating the plant formerly owned by the Ahrens & Ott Company, Louisville, Ky., one of the largest manufacturers of plumbers' supplies in the country. There had existed in the plant from time immemorial a pattern storage room, next to the original pattern room, in which were stored wood and iron master and working patterns when the stock supply to last for a period had been run off. After the patterns were turned over to the man in charge of the room, no one but he knew what became of them. Necessarily, he had some sort of crude system, probably based upon the general class of the various pieces, such as sinks, lavatories, bathtubs, and the like; but the finding of a given pattern was a hopeless task to all save the man in charge. He kept no records whatever, and the mystery of the system was closed to all save himself. In a word, if he had dropped dead many of the patterns would have been so buried in the storage room that they could have been found only by sheer chance.

This state of affairs, as the result of the inevitable delays and difficulties in locating a needed pattern when the stock of castings ran out, and of the consequent friction between departments, finally came to the attention of the plant manager, F. H. Reed. It appeared to him far from ideal, from any standpoint, especially in view of the fact that his pattern storage man was not immortal nor chained to his job. He therefore set about remedying it, and as the first—and, for him, the last—step in that direction, save as he was called upon from time to time for suggestions and approval, placed the matter in the hands of a competent man, familiar with the patterns, with directions to bring order out of chaos.

An Index or Catalogue Arranged

It took three months to produce an ordered arrangement of the patterns; and while the system is outlined and decided upon, it is estimated that it will take not less than six months longer to place it in full force and effect, as far as the actual cataloguing of the pieces is concerned. The idea, of course, is to produce an index, or key, or catalogue, which can be duplicated for the use of the several departments as many times as necessary, and will then enable anyone to find a desired pattern.

It is proposed to carry the patterns in the list under the factory's catalogue numbers, and thus avoid the necessity of a new arrangement. Each piece will also carry a reference to the catalogue page and to the place in the storage room where may be found the original wood master pattern, the iron master pattern or patterns, and the working patterns.

For the purposes of this index, the patterns are classified into about 30 groups, according to their kind, and these again fall readily into other smaller groups, according to model, size, and the like. This at once gives a logical basis upon which to work, not only in preparing the index, but in the work of storing the patterns themselves. A list of these 30 classes has been prepared and will be posted in the storage room and in each department where a book is used, as a bulletin, for ready reference, in order that it may be ascertained at a glance what the number of a given class is. From this reference is had to that particular section of the index, where will be found under its proper catalogue number the piece whose pattern is desired.

How the Patterns Are Arranged

The pattern storage room is a two-story building, about 60 ft. square. The storage is on racks, in double tiers or stories. The racks run round the walls on the two rooms and all of the floor space is taken up with them as well. Each rack is lettered beginning with A and running to H on the first floor, and there is an equal number on the upper floor, beginning with the letter I. The racks, in turn, are divided into six sections of convenient length, and the sections into shelves reaching from floor to the top of the section. There are from 10 to 12 shelves to a section, depending upon the size of the patterns for which they are used. Reference to the place where a given pattern is stored is thus a simple matter. All that is needed is the rack letter, with the section and shelf number—as A-6-9, meaning Rack A, Section 6, Shelf 9—and it requires but a moment to lay hands on the pattern wanted.

As a matter of convenience in handling, the working patterns, for which there are frequent calls, are placed on the ground floor, and the master patterns, both wood and iron, which are needed only for the purpose of running new working patterns, are on the second floor. As indicated above, this makes necessary three references to the same pattern in the index; but this arrangement was decided upon as a concession to rapidity in reaching the patterns wanted, while it was to some extent a sacrifice of brevity in recording. To have all three styles of each pattern side by side on the shelves would involve the occupying of ground floor space with patterns two-thirds of which would be required very seldom, and the consequent placing on the upper floor of working patterns, some of which would be called for every day.

Benefit Available to Every Man in the Plant

The new system of arrangement has worked splendidly and will unquestionably be an immense improvement over the haphazard storage plan of the past, especially when its benefits are rendered available to every man in the plant by means of the index which is in course of preparation. A similar system will be applied to the patterns for machinery and equipment of various sorts used in the plant, except that the index will be by departments using the machinery and parts, and, there being no factory catalogue numbers of these patterns, an alphabetical index by name of the piece becomes necessary.

The memory system has long been cast into the discard wherever it was possible to substitute records which would render the information formerly reposing in one man's brain accessible to all persons interested. While perhaps this has heretofore been true largely only of offices, the more advanced factories and shops are everywhere taking steps such as that of the Standard Sanitary Mfg. Company in reducing to an understandable and recordable system their storage of patterns.

Deforest Sheet & Tin Plate Company Extensions

The Deforest Sheet & Tin Plate Company, Niles, Ohio, has bought considerable ground adjacent to its plant for extensions. It is having a heavy demand for the products of its Lohmannizing department, not only for sheets but for the Lohmannizing of structural members and various kinds of iron and steel products where protection from corrosion is a vital feature; thus necessitating the enlargement of this department. The ground was also bought to secure room for an open hearth steel plant, which has been under consideration for some time. Unless the crude steel situation becomes more satisfactory as to deliveries the company will begin the erection of open hearth furnaces within two or three months. The engineering work on the proposed steel plant is completed, so that construction can be started at short notice.

The company is now adding three hot sheet mills and one jobbing mill, the latter to roll 10 to 16 gauge sheets. One of the new hot mills has been started and another will be ready in about a week. The plant will then have a total of nine hot mills, one jobbing mill and five cold mills. A low pressure Westinghouse turbine engine is being installed to drive the cold mills by electricity. The necessary enlargements to the heating and annealing departments are being made to serve the additional mills.

The William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., is the low bidder at $842,000 each for six new torpedo boat destroyers. A maximum construction price of $940,000 each was authorized by Congress. Seven bids were received, ranging from that named to $938,000 from the Seattle Construction & Drydock Company.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

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Steel Ingots and Rolled Steel in 1911

When the American Iron and Steel Association made public, about May 1, the statistics of production in 1911 of steel ingots and castings, the common view was that the statistics giving "the production of steel" for last year had been furnished. This view was not strictly correct. Steel is a commodity, bought and sold in the open market, and statistics of its production should naturally refer to the material which thus changes hands. As the exception tests the rule, it may be mentioned that occasional sales of ingots in these present days of famine in steel are remarked as being exceptional, for steel ingots are not usually an article of commerce. What the association returns as "finished rolled steel" is really the article of commerce, and statistics of this production have only been made public this month. There is a wide difference between the tonnage of steel ingots produced and the tonnage of finished rolled steel. The former statistics represent simply the record of the ingot scales, for in the rolling of the material into commercial form there is much cropping and other loss, and almost all the lost material goes back through the steel-making process, to pass over the ingot scales again.

Rolled iron and rolled steel are cognate materials. At one time practically all the material was rolled iron, a subsequent stage being that in which nearly all the rolled steel was in the form of rails, other rolled material being iron. Later, steel made such inroads upon iron that iron seemed likely to disappear, and the association did not, from 1891 up to 1904, return rolled iron and rolled steel separately. In 1904 the practice was established of segregating the products, the statistics thus gathered indicating quite clearly that rolled iron has its commercial place. The statistics of rolled iron and rolled steel, as far as they have been collected in recent years, are shown below in gross tons:

	Iron.	Steel.	Total.
1904	1,760,084	10,253,297	12,013,381
1905	2,059,990	14,780,025	16,840,015
1906	2,186,557	17,401,911	19,588,468
1907	2,200,086	17,664,736	19,864,822
1908	1,238,449	10,589,744	11,828,193
1909	1,709,431	17,935,259	19,644,690
1910	1,740,156	19,881,123	21,621,279
1911	1,460,615	17,578,556	19,039,171

A general definition of the "rolled steel" included in the foregoing figures is that it is steel weighed after shearing subsequent to its last hot rolling. Thus rolled forging billets are included, but not billets which are to be rolled further. Wire rods are included, because the next operation is to draw them, and for similar reasons nail plate, black plate, skelp, etc., are included, all in their ordinary commercial forms.

It is interesting to compare the production of steel ingots and rolled steel, noting the percentage of loss:

	Ingots.	Rolled steel.	Loss.
	Gross tons.	Gross tons.	Per cent.
1905	19,463,180	14,780,025	24.0
1910	25,154,087	19,881,123	21.0
1911	23,029,479	17,578,556	23.6

The loss indicated, of course, is only a temporary loss. It is not a loss of steel, but a loss from the steel ingot form. The steel itself is saved. The major portion of the scrap used in the manufacture of open-hearth steel is thus furnished, and it constitutes more than 20 or 25 per cent. of the charge, for the reason that there is considerable Bessemer scrap which goes into the basic open-hearth furnace. In 1911 34.2 per

cent. of all the ingots produced were of Bessemer steel.

By far the heaviest production of rolled iron and steel occurred in 1910, the 1911 production showing a decrease of 12 per cent., which made it fall not only below 1910 but also below 1906, 1907 and 1909. The changes in individual products were not in harmony with the changes in the totals by any means, for rails showed a heavy decrease, structural shapes a fairly heavy decrease and plates and merchant mill products a moderate decrease. Wire rods had a very striking increase and so had black plates for tinning. It is interesting to separate the plate and sheet production as in the table below, the figures in which refer to gross tons:

	Plates, No. 12 and heavier.	Sheets, No. 13 and lighter.	Black plates for tinning.	Total sheets and black plates
1905.....	2,041,206	983,437	507,587	1,491,024
1906.....	2,531,552	1,074,525	576,079	1,650,604
1907.....	2,660,060	1,084,700	504,072	1,588,722
1908.....	1,271,021	864,901	513,771	1,378,672
1909.....	2,379,098	1,248,404	606,844	1,855,248
1910.....	2,807,728	1,435,619	712,137	2,147,756
1911.....	2,334,341	1,358,110	795,598	2,153,708

The 1911 plate output fell 17 per cent. below that of 1910, and fell also below that of 1906, 1907 and 1909. The sheet output fell only 5 per cent. below that of 1910, and easily exceeded that of any other year. Black plates forged far ahead, passing the previous record, made in 1910, by 12 per cent.

The growth in the sheet output is strikingly brought out by comparing 1906 and 1911, which are only five years apart. From 1906 to 1911 plate production decreased 6 per cent., but that of sheets increased 26 per cent. Black plates increased still more, or by 38 per cent.

Of course sheets and tin plates—the black plate here reported being simply the raw material for tin and terne plate making—are articles of continued consumption, in good and bad years, while plates are used largely for new structures and for steel cars, the output, therefore, fluctuating widely as business is good or bad. This year will show a large gain in plates; but it is, nevertheless, clear that the sheet and black plate production is gaining steadily on that of plates, and it is not improbable that eventually it will be larger. The production of the lighter articles in steel is consistently gaining on that of the heavier articles, as steel passes more and more into general rather than special use. Another case in point is that of rods, already mentioned, which in 1911, a generally poor year, made a new record.

The Bridgeport Industrial Tax Levy System

The manufacturers of Bridgeport, Conn., have carried through an interesting and novel experiment in an attempt to secure an equitable apportionment of taxes on industrial property. Co-operating in the plan, the city assessors lumped the valuation of this class of property, and manufacturers representing over 90 per cent. of the total employed expert appraisers who reduced the value of each plant to terms of the percentage of the assessment upon which its owner should pay a tax. The assessors' valuation of those works which did not enter into the agreement was deducted, and the tax bills of the 90 per cent. were made out according to the percentages fixed by the expert appraisers. The lists which have just been filed show marked changes from those of last year. Some companies pay more, others less, while a few are not affected. Everyone is satisfied, apparently, that justice has been done. The cost of the work, as distributed among the various concerns, is not considered large.

The results are the culmination of efforts which date back three years. The division of taxes had not been fair; some manufacturers were paying too much and others too little—a condition that exists everywhere, though usually accepted as inevitable. A group of owners went to the assessors and unfolded the idea, requesting that the board determine just what share of the city's tax should be levied upon the industries. They asked that the manufacturers be permitted to determine for themselves what share of this total each should bear. The assessors agreed to the proposition, after consulting with the State authorities. The latter decided that as assessors have the right to employ outside assistance the proposed work could be considered as if the city were meeting the expense instead of interested taxpayers. The manufacturers consulted a prominent appraisal company, whose experts did not consider a detailed inventory of each plant necessary. If the same basis of estimate were employed in every case, they held that the results would be as fair to one as to another.

The assessors determined that about one-third of the taxable property of the city existed in its manufacturing industries, or something over $30,000,000. The appraisers, who put themselves under bond not to reveal the actual figures which they obtained, fixed the share of each of those in the agreement in percentages of the total industrial tax levy. A company having a valuation of $3,000,000 would pay 10 per cent, another 5 per cent and so on. The point was raised that if any one of the manufacturers had had an appraisal made by this company, knowing his own per cent. and that of the others, as well as his own valuation, he would be able to get at the exact valuation of all of them. This is not the case, however, as the appraisal was in the nature of an estimate, as has been stated, and certain elements were omitted which are of widely varying importance, in comparison with the total value of a business.

The assessors of a city or town are presumed to have a complete understanding of all property values; but it is well known that while their knowledge may give them a correct basis with some classes of property, a large part of their figures must be the result of guesswork. It cannot be otherwise, unless the department is made excessively costly by the employment of high-priced experts. The Bridgeport plan seems to do away with one important factor of error.

The system as outlined is carried out without difficulty under Connecticut laws, because the taxes are raised direct by cities and towns, the State corporation tax being purely nominal. In certain States, however, Massachusetts being an example, the complication would arise that corporations are taxed direct by the State, valuations being obtained from the corporation returns, while at the same time certain property, including real estate, is taxed direct by the cities and towns in which it is located. If, for example, the State authorities assess a corporation for $50,000, and the home city assesses the real estate for $20,000, then the State collects on a valuation of $30,000 only, and later this tax is distributed, a certain percentage going back

to the community where the works are located. Therefore the operation of the Bridgeport plan might be complicated in some States, though it is said the obstacles would not be prohibitive.

A Workmen's Compensation Flaw

A serious flaw which has come to light in the Massachusetts workmen's compensation act is that no provision is made for paying the hospital bills of accident patients after the first two weeks. The character or gravity of the injury is not taken into consideration. The State insurance organization, to which the employers contribute their premiums, pays the bill for the first two weeks and no longer. The owners, who are paying large premiums on their insurance against loss by accidents to their employees, do not feel that they are called upon to take up the expense where the State drops it. Therefore, the burden falls upon the hospitals, which are making vigorous protest. They have even gone to the point of announcing a radical increase in their charges for the two weeks, to make up for such income as they lose on impecunious persons who have to remain for treatment longer than the legal fortnight. In Boston the promise is that the fee for out patients will be $3 a treatment to the State, instead of the 50 cents which corporations have been paying for the same services. Under the law, the injured workman begins to draw half wages after the first two weeks, it is true, and doubtless the theory may be brought forward that he should pay for his hospital treatment out of this money. The hospitals realize, however, that in most cases the money will be needed for other purposes before the time comes for paying their bills.

Previous to the establishment of workmen's compensation no Massachusetts employer was required by law to pay the hospital bills of injured employees, but in practice employers usually saw to it that anyone who was seriously hurt in their works was given hospital care. The hospitals are accustomed to this condition, and they resent its abolition, because of the increased demand upon their resources resulting from the compensation law, coupled with a probably decreased remuneration. Under private compensation plans, the care of the injured was attended to automatically as a part of the system. For example, the Worcester works of the American Steel & Wire Company conducted compensation on more liberal terms than the State law provides, including skilled treatment in hospital and afterward until the victim was able to return to work. Other large corporations made it a practice to guarantee the hospitals against loss. The paternalism of the State has stepped in to replace that of the employer.

The action of the Legislature in refusing to countenance a private compensation plan, in place of that of the State, has a large influence in the consideration of the present situation. Several of these systems were well established, and the owners urged the Legislature to provide for their continuance, under State supervision. In the consideration of the original bill, and again last winter when an amendment providing for the exceptions was urged, the vote was against the request. And this was in spite of the fact that the private plans gave to employees a greater recompense in case of accident than that provided by the State. The effort will be made to amend the bill, in fairness to the hospitals, and possibly a third attempt to legalize a private system will be undertaken.

Correspondence

A Friendly Word for Iron

To the Editor: Of late years there has been heard superficial talk about the decadence of iron. The expansion of steel has been so great that it has caused a marked change in the percentage of iron to the total output of iron and steel but this is far from proving that this percentage of iron will work down to the diminishing point.

Wrought iron has been in the world ever since the days of Tubal Cain, the ancient captain of industry and "an instructor in brass and iron." In all the intervening years it has held its own sphere of usefulness against the inroads of steel whose history goes far back of the times which produced the famous Damascus blades. There have been many changes and evolutions in the production of both iron and steel since that remote period. "Tonnage" is a leading watchword in these modern days, and while steel is in the ascendency in this respect, iron holds its time-honored place and in some important features is coming into new favor and appreciation.

There are incontestible facts to prove that iron is much superior to steel in resisting rust and corrosion. Some large manufacturers of both iron and steel sheets advertise the fact that sheet iron is very much superior to steel for roofing, siding, etc., in enduring qualities against the elements. Wrought iron pipe is taking an important stand and commanding popular favor versus steel pipe for superior qualities in resisting corrosion, etc. Vibratory tests show up in favor of iron versus steel. The results of tests in a standard vibratory machine by a well-known testing expert and metallurgist show that iron exceeds steel by 135.9 per cent. in fatigue value.

It has been claimed by those who are disposed to look askance at iron that it is not homogeneous and that steel is; this is not controverted, but steel has its troubles even though claimed to be homogeneous. We have all heard of "blow holes" and "piped center" at times in steel and have seen blisters in open-hearth steel boiler plate, and laminations in homogeneous steel rolled for pipe and tubing purposes, rejected for this cause, which prevented perfect welding and threading. Neither iron nor steel manufacturers have reached the last word in the perfection of their products. Both are making progress and both products have their uses and there will be no eclipse, total or otherwise.

Iron made carefully and exclusively by the puddling process from pig iron of approved analysis gives the highest results and is in demand for the very best grades of particular work where many high qualities in the material must be fully guaranteed by the manufacturer, such as tensile strength, elastic limit, elongation, reduction of area, vibratory, bending hot and cold and other tests. The demand for iron of this character will not be displaced for the substitution of steel but it is necessarily limited in quantity in the total production of iron; neither is it probable that less expensive grades of iron are to be eliminated in the race, at least for many years to come. For a vast amount of ordinary uses, iron manufactured properly from selected scrap or a mixture of good scrap and puddled pig iron is still in excellent demand and in many cases preferred to steel where lasting qualities in actual use must be considered; where rust and corrosion is especially to be avoided, iron will have the preference. Iron men have had their troubles but one of them is not the fear of extinction of their product at any early day. On the contrary, they discover a new uplook in iron and believe that standard grades of refined iron have taken a new lease of life. J. A. B.

The Fort Smith Rolling Mills, Fort Smith, Ark., under the management of M. R. Arnold, has broken ground at South Fort Smith, for the erection of a plant to manufacture bars. The arrangements were effected through the Commercial Club.

The Geological Survey's Iron and Steel "Statistics"

The United States Geological Survey has recently published a pamphlet entitled "The Production of Iron Ore, Pig Iron and Steel in 1911," which is put out as an advance chapter from "Mineral Resources of the United States, Calendar Year 1911." It bears a 1912 imprint and no doubt was prepared in recent months. One questions at the start the sources from which its information was drawn when he reads on the introductory page this remarkable comment on the condition of the iron and steel trades in 1912:

> The prospects for 1912 are encouraging; but as at no time since 1907 has the excessive capacity for manufacturing iron and steel been fully utilized, nothing short of abnormal activity, which is not likely to occur in 1912, will result in employing the full capacity of the plants.

The reader's next challenge of the statistical method of the Survey is called out by the portion of the report devoted to iron ore. For the first time in all the years in which iron ore statistics have been gathered by the Survey those for 1911 represent "the total quantity of iron ore marketed for the purpose of making pig iron." It is stated that by "ore marketed" is meant "the quantity of ore sold or used by the producer for the manufacture of pig iron." The confusion resulting from adopting this new basis appears in the later statistical tables, all of which retain the original heading "Production of Iron Ore in the United States." Thus the ore sent to market last year is compared with ore *produced* in the year 1910. At the same time, apparently, statistics of stocks on hand at mines have been collected as usual. These are given as 11,969,060 gross tons at the end of 1911, as compared with 9,403,235 tons on December 31, 1910. It is added that there are also stocks at receiving ports (referring to the Lake Superior iron ore trade) and furnaces but that "these are included in the total sales of ore."

It is quite plain that the new classification adopted by the Survey will result in a statistical jumble that will prevent intelligent comparison of the figures from year to year. The statement of the pamphlet that stocks at receiving ports and furnaces "are included in the total sales of ore" for any given year is seriously in error. It is well known that the stocks at receiving ports include ore that is unsold and therefore cannot be considered as marketed; also that the stocks at furnaces often include ore that has been carried over for more than a year and therefore cannot be represented by the statistics of a given twelve months. The only figures properly comparable, and the only ones which represent the performance of the iron mining industry of the country in any year, are those which show actual production. All statements of iron ore stocks have only a collateral significance, determined by the state of the pig iron industry—the ability of the furnaces to use up ores on hand—and are therefore not a criterion of what has actually taken place in iron mining.

An unexplained discrepancy appears in the statement of shipments of iron ore from mines in the Province of Oriente, Cuba, and the amount of iron ore imported into the United States from Cuba in 1911. The latter amount is given as 1,147,879 tons, while the shipments from the Oriente Province mines are reported as 1,739,726 tons. The producers were the Spanish-American Iron Company, credited with 1,216,520 tons; the Juragua Iron Company, Ltd., with 355,132 tons, and the Ponupo Maganese Company, with 168,074 tons. It is known that these three companies shipped their product to the United States, but no explanation is given of the difference of 600,000 tons between their total shipments and this country's total imports from Cuba. By turning to the American Iron and Steel Association figures, however, we find that the Spanish-American Iron Company's shipments last year were 640,510 tons, instead of 1,216,520 tons, as given by the Survey.

On page 38 appears the surprising statement that "the figures of output of pig iron and steel given for 1910 and 1911 were collected by the United States Geological Survey." This will be news to the manufacturers of iron and steel, since complete reports of their production have been furnished only to the American Iron and Steel Association. In a later page of the pamphlet credit is given to the association for the separation of the pig iron statistics according to grades of pig iron, but its authentic total, 23,649,547 tons, contrasts with that which the Survey gives on its own account, which is 23,257,288 tons. This latter may be intended as an approximation of the production of coke and anthracite pig iron, leaving out charcoal iron, but even at that, the statistics were not collected by the Geological Survey, and should be credited to the sources from which they were taken.

Farther along we come upon tables showing the production of steel ingots in 1910 and 1911, but these contain the familiar figures of the American Iron and Steel Association, appropriated entirely without credit. It is stated on a later page, however, that "according to the satistics of the American Iron Trade for 1911 the total electric production of steel in that year was 29,105 tons as compared with 52,141 tons in 1910,"—evident concession that the electric steel industry, at least, is properly provided for in a statistical way.

We are loath to believe that this 1911 report on iron ore, pig iron and steel is representative of Geological Survey standards of statistical work. As an effort to improve upon what was so well done in the iron ore and iron and steel monographs of other years, it cannot be called a success.

For the Foundry Convention of 1913

A joint meeting of the executive committees of the American Foundrymen's Association, the American Institute of Metals and the managing board of directors of the Foundry & Machine Exhibition Company will be held in Chicago, December 3, to decide on the time and place of the 1913 foundry conventions and exhibit. The comparison recently made of the exhibit held at Pittsburgh at the convention in May, 1911, and that held at Buffalo in September of this year shows 120 exhibitors for the former and 108 for the latter. The difference is accounted for by the fact that 21 local Pittsburgh firms exhibited, while in Buffalo but 10 local firms participated. The number of square feet of space used in 1911 was 34,630; in 1912 the total was 29,131. The receipts for permits, entrances and space for 1912 at Buffalo were $2,105.05 less than at Pittsburgh.

At the annual meeting of the Foundry & Exhibition Company held in Pittsburgh, October 28, it was voted to contribute $500 to the work of the American Foundrymen's Association and $250 to the work of the American Institute of Metals. It was also voted that a cash dividend of 15 per cent. of the amount paid for space rental be paid on or before November 20, 1912, to all exhibitors who have exhibited for two consecutive years, and to notify all first year exhibitors that a reserve fund equal to 15 per cent. of the amount paid by them for space rental has been set aside to be paid them should they become exhibitors in 1913.

The following officers were elected for the ensuing year: F. N. Perkins, president; R. S. Buch, vice-president; J. S. McCormick, treasurer; C. E. Hoyt, secretary. The directors elected are Wilfred Lewis, F. N. Perkins, George R. Rayner, E. H. Mumford, A. M. Frauenheim, Henry A. Pridmore, R. S. Buch, Edward A. Pridmore, N. R. Atwater, J. W. Campbell, J. S. McCormick and C. E. Hoyt. F. N. Perkins, R. S. Buch, J. S. McCormick, George R. Rayner and C. E. Hoyt constitute the board of managing directors for the ensuing year.

The L. A. Norris Company, San Francisco, Cal., handling the Clinton line of concrete reinforcement, has purchased a lot containing 40,000 sq. ft. on Townsend street near Second, in that city, with the intention of putting up a large warehouse.

The Iron and Metal Markets

Large Iron Ore Sales for 1913

Advances of 55 to 65 Cents a Ton

Railroad Demand Still Heavy—Steel Making Pig Iron Active and Higher

Lake Superior iron ore prices for 1913 were established on Tuesday by large sales, probably more than 4,000,000 tons, at 10 cents a ton lower than the basis of 1911. The new prices are $4.40 for old range Bessemer, $4.15 for Mesaba Bessemer, $3.60 for old range non-Bessemer and $3.40 for Mesaba non-Bessemer. The advance over this year's prices is 65 cents for Bessemer ores and 55 cents on non-Bessemer. On Mesaba ores, sellers have 10 cents advantage in the above figures over the basis for 1911, in view of the reduction of 20 cents in freights made this year by Minnesota ore roads. It is stated that the recently proposed reduction in guaranteed iron content of base ores for 1913 will not be made.

A large part of the Bessemer ore available for next year had already been sold, subject to a later fixing of prices. Considerable of the non-Bessemer product had also been reserved. Sellers argue that taxes have been increased in the past year, that lake freights in 1913 are certain to be higher, that wages may advance, and finally, that profits in 1912 have been very unsatisfactory. Estimates of a 50,000,000-ton output are being made for next year. Labor supply is already a factor. As a means of holding working forces at open-pit mines some of the larger companies are arranging for stripping and other winter work that under ordinary conditions might go over for another year.

Steel trade conditions thus far show no change which can be considered due to plans announced for early legislation on duties, though it is known that the buying policy of many manufacturers will be conservative, in view of their opinions as to the effect of tariff reductions.

The Steel Corporation is operating 95 per cent. of its steel making capacity and last week reached 96 per cent. Its bookings are still running in excess of its production and its policy appears to be to sell as far into next year as buyers' needs require, at the contract prices now ruling.

Railroad requirements have again been a large factor in the week's business. Car orders have been estimated at 12,000 to 15,000. In the Chicago district 30,000 tons of car material was closed by one seller, nearly all for delivery in the second half of 1913. In eastern Pennsylvania inquiries are up for 50,000 tons of rolled steel for second and third quarter delivery to a railroad car works.

It is estimated that more than 2,000,000 tons of rails are already booked for 1913. The United States Steel Products Company has taken 18,000 tons for the Trans-Australian Railway. Of the 65,000 tons ordered for the New Haven and controlled lines about 25,000 tons each goes to Bethlehem and Pennsylvania steel companies and 15,000 tons to the Lackawanna company.

Structural steel contracts include a good percentage of railroad work. In the East 3,200 tons was placed by the Lackawanna Railroad, its bridge requirements for 1913. Export contracts include 10,000 to 12,000 tons for the steel work at Prince Rupert's, the Pacific Coast terminal of the Canadian Northern.

Rumors of expected price advances relate particularly to wrought pipe and wire products. It is questionable if early advances will be generally established in either product. A $2 advance in rivets has been made in the past week.

The remarkable demand for bar iron has started up a number of mills that have been idle for years.

The Standard Oil Company has been in the market for Welsh tin plates, but prices quoted have been considered high and the business is still pending.

Steel-making pig iron has been more active. One steel company at Pittsburgh has bought 40,000 tons of Bessemer iron, $17 at Valley furnace being the basis for a part, but on nearly 30,000 tons $17.25 at furnace was paid. Late sales of basic iron, including one of 4,000 tons for first quarter delivery, have been made at $16.50 Valley furnace. In eastern Pennsylvania 7,000 tons of low phosphorus iron was sold, most of it at $24 delivered.

Foundry pig-iron markets without exception report lessening sales. In New York and Pennsylvania, however, some large inquiries are pending. Coke and ore advances have caused sellers to stand firmly for the higher prices recently asked. In Southern iron some deviation appears from the $14 basis for No. 2 and recent sales for early 1913 delivery have been made as low as $13.50 at furnace. The leading Virginia furnace interest has withdrawn as a seller of No. 2 X foundry iron for delivery before July 1.

The coke deadlock is broken and large contracts for 1913 have been put through at $3 to $3.25, chiefly at the latter price, while as high as $3.50 has been paid for furnace coke running low in sulphur.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Nov. 20, 1912.	Nov. 13, 1912.	Oct. 23, 1912.	Nov. 22, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia.	$18.25	$18.25	$18.00	$14.90
Foundry No. 2, Valley furnace.	17.00	17.00	16.25	13.25
Foundry No. 2, S'th'n, Cin'ti..	17.25	17.25	16.75	13.25
Foundry No. 2, Birmingham, Ala.	14.00	14.00	13.50	10.00
Foundry No. 2, furnace, Chicago*	**18.00**	17.50	17.00	14.00
Basic, delivered, eastern Pa....	**18.25**	18.00	18.15	14.50
Basic, Valley furnace.....	**16.50**	16.25	16.15	12.35
Bessemer, Pittsburgh	**18.15**	17.90	17.90	14.90
Malleable Bessemer, Chicago....	18.00	18.00	17.00	14.35
Gray forge, Pittsburgh.....	**16.75**	16.40	16.40	13.40
Lake Superior charcoal, Chicago	18.75	18.75	18.75	16.50
Billets, etc. Per Gross Ton:				
Bessemer billets, Pittsburgh....	27.00	27.00	27.00	19.00
Open hearth billets, Pittsburgh..	27.50	27.50	27.50	18.50
Forging billets, Pittsburgh.....	34.00	34.00	34.00	24.00
Open hearth billets, Philadelphia	32.00	32.00	30.00	21.40
Wire rods, Pittsburgh.....	30.00	30.00	28.50	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	18.00	18.00	18.00	14.50
Iron rails, Philadelphia.....	19.00	19.00	18.00	15.50
Car wheels, Chicago.....	17.00	17.00	16.50	12.00
Car wheels, Philadelphia	15.00	15.00	15.00	11.25
Heavy steel scrap, Pittsburgh....	*15.00*	15.25	16.25	12.00
Heavy steel scrap, Chicago.....	13.50	13.50	14.25	9.50
Heavy steel scrap, Philadelphia	15.50	15.50	15.50	11.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel,	Nov. 20, 1912.	Nov. 13, 1912.	Oct. 23, 1912.	Nov. 22, 1911.
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.67½	1.67½	1.60	1.20
Iron bars, Pittsburgh.....	1.65	1.55	1.50	1.20
Iron bars, Chicago.....	1.55	1.55	1.50	1.15
Steel bars, Pittsburgh, future..	1.40	1.40	1.40	1.05
Steel bars, Pittsburgh, prompt..	1.60	1.60	1.40	1.05
Steel bars, New York, future..	1.56	1.56	1.56	1.21
Steel bars, New York, prompt..	1.76	1.76	1.56	1.21
Tank plates, Pittsburgh, future	1.45	1.45	1.45	1.10
Tank plates, Pittsburgh, prompt	1.60	1.60	1.45	1.10
Tank plates, New York, future..	1.61	1.61	1.61	1.26
Tank plates, New York, prompt	1.76	1.76	1.61	1.26
Beams, Pittsburgh, future.....	1.45	1.45	1.45	1.10
Beams, Pittsburgh, prompt.....	1.70	1.70	1.45	1.10
Beams, New York, future.....	1.61	1.61	1.61	1.26
Beams, New York, prompt.....	1.86	1.86	1.61	1.26
Angles, Pittsburgh, future.....	1.45	1.45	1.45	1.10
Angles, Pittsburgh, prompt.....	1.70	1.70	1.45	1.10
Angles, New York, future.....	1.61	1.61	1.61	1.26
Angles, New York, prompt....	1.86	1.86	1.61	1.26
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.40	1.12½
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.45	1.20
Steel hoops, Pittsburgh.....	1.50	1.50	1.45	1.30
Sheets, Nails and Wire,				
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.25	2.25	2.25	1.85
Wire nails, Pittsburgh.....	1.70	1.70	1.70	1.55
Cut nails, f.o.b. Eastern mills..	1.75	1.75	1.65	...
Cut nails, Pittsburgh.....	1.70	1.70	1.70	1.50
Fence wire, ann'l'd., 0 to 9, P'gh.	1.50	1.50	1.50	1.35
Barb wire, galv., Pittsburgh....	2.10	2.10	2.10	1.85
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt shipment..	$3.85	$4.00	$3.75	$1.55
Furnace coke, future delivery..	3.00	3.25	2.75	1.65
Foundry coke, prompt shipment	4.25	4.25	4.00	1.90
Foundry coke, future delivery..	3.75	3.75	3.50	2.10
Metals,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	17.75	17.75	17.75	13.00
Electrolytic copper, New York..	17.62½	17.55	17.62½	12.87½
Spelter, St. Louis.....	7.35	7.30	7.40	6.60
Spelter, New York.....	7.50	7.45	7.55	6.75
Lead, St. Louis.....	4.50	4.57½	4.90	4.27½
Lead, New York.....	4.65	4.72½	5.05	4.35
Tin, New York.....	49.65	50.00	50.40	43.35
Antimony, Hallett, New York..	9.75	9.75	9.75	7.65
Tin plate, 100-lb. box, Pittsburgh	$3.60	$3.60	$3.60	$3.40

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.; New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.60c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 1-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3/16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive fire box steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. and over, and zees, 3 in. and over, 1.45c. to 1.60c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.50 to 1.55
H-beams over 18 in.....	1.50 to 1.55
Angles over 6 in.....	1.50 to 1.55
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card, Sept. 1, 1909.....	1.50 to 1.55
Tees, 3 in. and up.....	1.50 to 1.55
Angles, channels and tees, under 3 in. plus full extras as per steel bar card, Sept. 1, 1909:.	1.50 to 1.55
Deck beams and bulb angles.....	1.75 to 1.80
Hand rail tees	2.20 to 2.30
Checkered, trough and corrugated floor plates...	2.35 to 2.55

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 2 ft. inclusive.....	.25
Under 2 ft., to 1 ft. inclusive.....	.50
Under 1 ft.....	11.55

No charge for cutting to lengths 3 ft. and over.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8.....	1.60
Nos. 9 and 10.....	1.65
Nos. 11 and 12	1.70
Nos. 13 and 14	1.75
Nos. 15 and 16	1.80

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.90
No. 12	1.90
Nos. 13 and 14	1.95
Nos. 15 and 16	2.00
Nos. 17 to 21	2.05
Nos. 22 and 24	2.10
Nos. 25 and 26	2.15
No. 27	2.20
No. 28	2.25
No. 29	2.30
No. 30	2.40

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.40
No. 12	2.50
Nos. 13 and 14	2.50
Nos. 15 and 16	2.65
Nos. 17 to 21	2.80
Nos. 22 and 24	2.95
Nos. 25 and 26	3.10
No. 27	3.25
No. 28	3.40
No. 29	3.55
No. 30	3.70

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

Corrugated Roofing Sheets by Weight.

	29	25 to 28	19 to 24	12 to 18
Painting.				
Regular or oiling	...	0.15	0.10	0.05
Graphite, regular	...	0.25	0.15	0.10
Forming.				
2, 2½, 3 and 5 in. corrugated	0.05	0.05	0.05	0.05
2 V-crimped, without sticks..	0.05	0.05	0.05	...
⅛ to 1¼ in. corrugated.....	0.10	0.10	0.10	...
3 V-crimped, without sticks...	0.10	0.10	0.10	...
Pressed standard seam, with cleats	...	0.15	0.15	...
Plain roll roofing, with or without cleats	0.15	0.15	0.15	...
Plain brick siding	...	0.20	...	...
3-15 in. crimped	0.20	0.20	0.20	...
Weatherboard siding	...	0.25	0.25	...
Beaded ceiling	...	0.25	0.25	...
Rock face brick and stone siding	...	0.25	0.25	...
Roll and cap roofing, with caps and cleats	0.25	0.25	...	...
Roofing valley, 12 in. and wider	...	0.25	0.25	...
Ridge roll and flashing (plain or corrugated)	...	0.65	0.65	0.65

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Standard Charcoal Iron.*	
1¼ to 2⅛ in.....	62	1½ in.	46
2½ in.	64½	1¾ to 2¼ in.....	48
2¾ to 3¼ in.....	69½	2½ in.	53
3½ to 4 in.....	72	2¾ to 3¼ in.....	55½
5 and 6 in.....	64½	3½ to 5 in.....	58
7 to 13 in.....	62	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.50; galvanized, $1.90. Galvanized barb wire, to jobbers, $2.10; painted, $1.70. Wire nails to jobbers, $1.70.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (card weight) in effect from September 10, 1912, one point greater being allowed on merchant weight; iron pipe (full weight), from October 21, 1912:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜	72	52	⅛ and ¼	67	48
½	76	66	⅜	66	47
¾ to 3	79	71	½	70	57
			¾ to 1½	73	62
			2 and 2½	73	62

Lap Weld.

2	76	68	1¼	57	46
2½ to 6	78	70	1½	68	57
7 to 12	76	66	2	69	59
13 to 15	53	..	2½ to 4	71	62
			4½ to 6	71	62
			7 to 12	69	56

Plugged and Reamed.

1 to 3, butt	77	69	1 to 1½, butt	71	60
2, lap	74	66	2, butt	72	61
2½ to 4, lap	76	68	1¼, lap	55	44
			1½, lap	66	55
			2, lap	67	57
			2½ to 4, lap	69	60

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜	68	58	⅜	64	53
½	73	67	½	68	61
¾ to 1½	77	71	¾ to 1½	72	63
2 to 3	78	72	2 and 2½	73	64

Lap Weld, extra strong, plain ends.

2	74	66	1½	66	60
2½ to 4	76	68	2	67	59
4½ to 6	75	67	2½ to 4	71	62
7 to 8	68	58	4½ to 6	70	61
9 to 12	63	53	7 and 8	64	54
			9 to 12	59	48

Butt Weld, double extra strong, plain ends.

½	63	57	½	58	50
¾ to 1½	66	60	¾ to 1½	61	53
2 to 2½	68	62	2 to 2½	63	55

Lap Weld, double extra strong, plain ends.

2	64	58	2	56	50
2½ to 4	66	60	2½ to 4	61	55
4½ to 6	65	59	4½ to 6	60	54
7 to 8	58	48	7 to 8	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Pittsburgh

PITTSBURGH, PA., November 20, 1912.

The predicted slowing down in the steel trade to follow the election has not come. On the contrary, the situation is as strong as to prices and as active as to demand as at any time since the upward movement started. While the new demand for finished iron and steel has slackened to some extent, the insistence for deliveries against contracts is as great as ever. The mills are not able to come anywhere near satisfying the demand. Jobbers and consumers are using all kinds of tactics to get deliveries on material, while the mills are pursuing the policy of dividing their output as equitably as they can. In local steel circles the action of President-elect Wilson in calling an extra session of Congress not later than April 15 is commended. The opinion is that if any changes are to be made in the tariff the sooner they are made the better it will be. The amount of finished material that leading makers can spare for delivery in first quarter is very light, and they have large contracts on their books for delivery in second quarter. In sheets and tin plates an enormous tonnage has been booked for next year, heavier than ever before at this time. The market on raw materials, particularly pig iron, is strong. Still higher prices on some lines of finished material, notably wire products, are likely in the near future. The one weak spot in the situation is scrap, which has again shown a marked decline. Coke contracts have been numerous at prices lower than the coke makers started out to ask several months ago. The only advance noted in the week, aside from pig iron, is on rivets, which are up $2 a ton.

Pig Iron.—Heavy sales have been made, and further large lots are under negotiation. The Jones & Laughlin Steel Company has again come in the market and bought over 40,000 tons of Bessemer iron for first quarter delivery at its South Side works in this city at $17 to $17.25, Valley furnace, the higher price having been paid for most of it. Another local interest has bought 10,000 tons of Bessemer for first quarter at $17.25, Valley furnace, and another lot of 7500 tons is reported to have been sold at the same price, equal deliveries January to May, 1913. The market on malleable Bessemer has been active and prices are higher. Sales are reported of one lot of 6000 tons, another of 3000 tons and a third of 1500 tons at $17 to $17.25, Valley furnace. Basic has been moved up 25c. a ton, a local open hearth steel plant having bought 4000 tons for first quarter at $16.50, while a sale of 10,000 tons made about the middle of last week was at $16.25, Valley furnace. Foundry iron is in fair demand. The market on forge iron is also showing life after being dull for some weeks. A sale of 3000 tons for January, February and March is reported at about $15.85, Valley furnace. We quote standard Bessemer iron at $17.25 for remainder of this year and first quarter; basic, $16.50 for same deliveries; No. 2 foundry, $17 for prompt and $17 to $17.25 for first quarter; gray forge, $15.85 to $16; malleable Bessemer, $17 to $17.25, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

Billets and Sheet Bars.—The available supply of both Bessemer and open-hearth steel for prompt delivery is largely in the hands of local dealers who have secured a fair quantity by making trades of pig iron and scrap. The leading makers are on the buying side instead of selling. Two of the largest consumers in this district have been scouring the market for two or three weeks trying to buy steel but with little success. Open-hearth sheet bars have sold in small lots for prompt shipment as high as $28.50 at makers' mills and one consumer who offered $28 for 2000 tons of open-hearth bars for this year has so far failed to get the steel. For shipment at convenience of the mill we quote: Bessemer billets, $27; Bessemer sheet bars, $27.50; open-hearth billets, $27.50, and open-hearth sheet bars, $28, f.o.b. mill, Pittsburgh or Youngstown. Forging billets are $34 or higher and axle billets are about $32 to $33, Pittsburgh.

Ferroalloys.—On ferromanganese two local dealers report they have been instructed to refer all inquiries to the home offices before naming prices. On a firm inquiry for 600 tons for first half, $65, Baltimore, was quoted, but the business has not been closed. There is a good deal of inquiry, and consumers who covered months ago at low prices complain they are not getting deliveries and have to buy a car or two in the open market every little while to help out. We note sales of three cars of English and two cars of German ferromanganese for prompt delivery at $75, Baltimore, also sales of several lots of 50 per cent. ferrosilicon for prompt shipment at the same price. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh. We quote 10 per cent. at $24; 11 per cent., $25; 12 per cent., $26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

Steel Rails.—A part of the Baltimore & Ohio order for 50,000 tons went to the Cambria Steel Company, which is reported as having taken 15,000 tons. The demand for light rails is very active, the Carnegie Steel Company having received new orders and specifications in the past week for close to 5000 tons. This company has its light rail mill at Bessemer pretty well sold up to February 1. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Wire Rods.—The market continues active and there is still a scarcity of rods for this year. An inquiry for 1500 tons for either Bessemer or open-hearth which has been in the market for some time has not yet been closed. Two makers of rods are now refusing to quote on outside business, having none to spare. We quote Bessemer, open-hearth and chain rods at $30 Pittsburgh.

Muck Bar.—Inquiry is fairly active, one consumer asking for 1000 tons and another for 500 tons. Some Eastern muck bar is finding its way into this market on account of the local scarcity. We quote best grades, made from all pig iron, at $32 to $32.50, Pittsburgh.

Skelp.—Local mills have sold a good part of their output through the first quarter and the market is still active. Prices on iron skelp are likely to be higher on account of the recent advance in puddling wages and the higher price of gray forge iron. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.80c. to 1.85c., delivered at buyers' mills in the Pittsburgh district.

Plates.—Car buying has been active. The order of the Chesapeake & Ohio, it now appears, was for 4000 70-ton steel hopper cars, 3000 of which went to the Pressed Steel Car Company and 1000 to the Standard. The Chicago, Milwaukee & St. Paul has placed 3000 steel underframes with the Bettendorf Axle Company, Davenport, Iowa. The Chicago & Northwestern has bought 6000 cars, distributed as follows: Pullman Company 1000 40-ton box cars and 500 40-ton flat cars 1000 steel ore cars 23 baggage cars 10 steel passenger coaches four steel parlor cars and two steel dynamo buffet cars; with the American Car & Foundry Company, 1500 40-ton box cars, 2000 steel gondolas and 10 steel smoking cars. The Chicago, St. Paul, Minneapolis & Omaha has placed 500 steel gondolas with the American Car & Foundry Company and 500 box cars with the Pullman Company. The Pittsburgh & Lake Erie has increased its recent order placed with the Standard Steel Car Company to 1500 coal cars. The Chicago, Terre Haute & Southern has placed 900 coal cars with the Haskell & Barker Car Company, while the Delaware, Lackawanna & Western has bought 2200 cars, divided as follows: American Car & Foundry Company, 500 gondolas, 500 box and 250 hoppers; Standard Steel Car Company, 250 hoppers and 200 refrigerator cars; the Barney & Smith Car Company, 500 box cars. Heavy contracts for steel plates covering these cars have been placed, and one leading local mill is reported to have already contracted for nearly its entire output of steel plates for 1913. Some work is coming up in California, which, if it goes through, will take upward of 40,000 tons. The leading plate mills cannot take new orders for delivery under four to six months, while the smaller mills that can promise deliveries within four to six weeks are readily able to obtain premiums of $2 to $3 a ton over regular prices. We quote ¼-in. and heavier tank plates at 1.45c. to 1.50c., Pittsburgh, for delivery in first and second quarter, but for shipment within two to four weeks from date of order at 1.60c. to 1.70c.

Structural Material.—Inquiry has been heavier and local fabricators are pretty well filled up for three or four months. The McClintic-Marshall Construction Company has taken 600 tons for a new building for the Weirton Steel Company, Weirton, W. Va. Two new local theater projects are under way, one in the business section and one in the East End in this city, which will require 5000 to 6000 tons. The American Bridge Company has taken 1800 tons of bridge work for a Western road. We quote beams and channels up to 15 in. at 1.45c., for delivery at convenience of the mills, and this would probably be in second quarter of next year, while for reasonably prompt shipment small lots are being sold at 1.60c. to 1.80c., Pittsburgh. The Riter-Conley Mfg. Company has taken a contract for 2100 tons of structural steel for a new 10-story building for the New Process Company, Syracuse, N. Y., and 750 tons of bridge work for the Pennsylvania Lines West.

Car Wheels.—A leading Western road is reported to have placed about 2000 wheels for freight service with a local interest. We quote 36-in. steel wheels for pasenger service at $18.50 and 33-in. for freight service at $14.50 per wheel, f.o.b. Pittsburgh.

Iron and Steel Bars.—A feature of the market is the heavy demand for iron bars, which is more active now than at any time in the past five or six years. This is resulting in a number of bar iron mills starting up that have been inactive for a long time, the latest of these being the plant of the Eleanor Iron Works at Hollidaysburg, Pa. The steel car companies are specifying at an enormous rate against contracts and the situation as to deliveries seems to be getting steadily worse. Local makers of steel bars will not accept new orders for delivery before second quarter. We quote merchant steel bars at 1.40c. to 1.45c. for this delivery, while for shipment this year from 1.50c. to 1.75c. is readily paid by consumers. Prices on iron bars are now 1.65c. to 1.70c. at mill for reasonably prompt shipment. Mills continue to charge $1 extra per ton for twisting ¾-in. and larger steel bars and $2 extra for ½ to ⅝ in.

Sheets.—In spite of the lateness of the season and the fact that most large consumers are pretty well covered through first quarter and some into second quarter of next year, the demand continues heavy, and the mills are not improving their condition as regards deliveries. A mill able to make deliveries in two to three weeks from date of order can readily secure $1 to $2 a ton over regular prices. It is likely that early in December the price of sheet bars will be fixed for first quarter; while nothing official has been given out, the prediction is made that $26 at makers' mill, Youngstown or Pittsburgh, for Bessemer and open hearth sheet bars will be close to the price. The market is very strong on the basis of prices given on a previous page.

Tin Plate.—The new buying both for this year and from the large consumers for first quarter and first half of next year is pretty well over. One leading maker states that his output for the greater part of 1913 is practically under contract. It is believed that the increase in output of tin plate this year over 1911 will be at least 100,000 tons and may be very close to 150,000 tons. We quote $3.60 per base box for 14 x 20 coke plates for delivery through first quarter and first half of next year.

Hoops and Bands.—There is not much new buying, consumers being pretty well covered through first quarter and first half of next year. We quote steel bands at 1.40c. to 1.45c., with extras as per the steel bar card, and hoops at 1.50c., Pittsburgh, for shipment through first quarter.

Bolts and Rivets.—Another advance of $2 a ton has been made in rivets, and we now quote button head structural rivets at $2.10 and cone head boiler rivets at $2.20 per 100 lb. for forward delivery. For prompt shipment a premium of $2 a ton is asked over these prices. The demand for bolts and rivets is heavy and all the makers are badly oversold and much behind in deliveries. The new discount on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 7½% off
Small carriage bolts, rolled threads	75, 10 and 2½% off
Large carriage bolts	70 and 5% off
Small machine bolts, rolled threads	75, 10 and 7½% off
Small machine bolts, cut threads	75, 10 and 2½% off
Large machine bolts	70 and 10% off
Machine bolts with C.P.C. and T nuts, small	75 and 7½% off
Machine bolts with C.P.C. and T nuts, large	70 and 2½% off
Square hot pressed nuts, blanked and tapped	$5.80 off list
Hexagon nuts	$6.40 off list
C.P.C. and R. square nuts, tapped and blank	$5.80 off list
Hexagon nuts ⅝ and larger	$6.70 off list
Hexagon nuts smaller than ⅝	$7.30 off list
C.P. plain square nuts	$5.30 off list
C.P. plain hexagon nuts	$5.60 off list
Semi-finished hexagon nuts ⅝ and larger	85 and 5% off
Semi-finished hexagon nuts smaller than ⅝	85, 10 and 5% off
Small rivets	80 and 5% off

Spelter.—The market has been quiet, with prices ruling only fairly firm. We continue to quote prime grades of Western at 7.25c., East St. Louis, equal to 7.37½c., Pittsburgh.

Railroad Spikes.—The railroads are going to lay a very large amount of new trackage next year, which accounts for the very heavy new demand for railroad spikes and the liberal specifications against contracts. The New York, New Haven & Hartford has placed an order for 25,000 to 30,000 kegs with a local maker for next year. Prices are firm. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.90 and small railroad and boat spikes at $1.90 to $2 per 100 lb., f.o.b. Pittsburgh, for first quarter and first half 1913 delivery.

Wire Products.—Between now and December 1 the leading interest is expected to make announcement of an advance of 5c. or 10c. per keg in wire nails and $1 to $2 a ton in wire. The new demand for wire nails and wire is active, and specifications are very liberal. Several of the smaller makers state they are able to obtain premiums of $2 a ton for prompt deliveries on both wire and wire nails. We quote wire nails at $1.70 to $1.75 per keg; cut nails, $1.70 per keg; galvanized barb wire, $2.10 per 100 lb.; painted, $1.70; annealed fence wire, $1.50, and galvanized fence wire, $1.90, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

Merchant Steel.—Specifications against contracts are still coming in freely, the mills being considerably back in deliveries, but the new demand is only fairly

active, as jobbers are pretty well covered. We quote: Iron finished tire, 1½ x ⅜-in. and larger, 1.40c. base; under 1½ x ⅜-in., 1.55c.; planished tire, 1.60c.; channel tire, ¾, ⅞ and 1 in., 1.90c.; 1⅛ in. and larger, 1.80c.; toe calk, 2c. base; flat sleigh shoe, 1.50c.; concave and convex, 1.80c.; cutter shoes, tapered or bent, 2.40c. to 2.45c.; spring steel, 2c.; machinery steel, smooth finish, 1.80c. to 1.85c.

Shafting.—Most large consumers are covered by contracts for a considerable time ahead, but the new demand is fairly active. Prices are firm. We quote cold rolled shafting at 60 per cent. off in carloads and larger lots and 55 per cent. in small lots delivered in base territory.

Merchant Pipe.—The general demand for merchant sizes of steel and iron pipe continues quite active, but on the larger sizes for gas and oil lines has quieted down. A California oil interest is in the market for six to eight miles of 16-in. pipe and there are other small inquiries. All the mills are back in deliveries from four to six weeks or longer, and will likely carry over into next year some tonnage that should have been shipped out this year. Prices on both iron and steel pipe are reported as being firmly held.

Boiler Tubes.—A large contract for boiler tubes for delivery in the Chicago district is reported to have been placed the past week. All the mills rolling steel and iron tubes are pretty well sold up over the next two or three months and discounts are firm.

Coke.—The deadlock between coke makers and furnace operators seems to have been broken and some heavy contracts for furnace coke have been placed for next year as follows: 5000 tons a month for first half at $3; 6000 tons a month at $3.50, same delivery; 3000 tons a month at $3.50, same delivery; 8000 tons a month for all of next year at $3; 7000 tons a month for first half at $3.25; 5000 tons a month at the same price and for the same deliveries, and 5000 tons a month for first half at $3, all per net ton at oven. It is stated that the contracts for furnace coke noted above at $3.50 are for special grades of coke running very low in sulphur. The new demand for furnace coke is quiet, as consumers seem to be pretty well covered, but on foundry coke is active. Some consumers of foundry coke that have paid $3 and above are reported to have also contracted for fairly large tonnages of cokes made outside of the Connellsville region which they have obtained at $2.50 or lower and this will allow them to bring down their average cost. We quote standard makes of furnace coke for prompt shipment at $3.85 to $4 and for first half of next year delivery at $3 to $3.25, per net ton a oven; standard grades of 72-hr. foundry coke for prompt shipment, $4.25 to $4.50, and for first half, $3.75 to $4, per net ton at oven. The Connellsville Courier reports the output last week in the Upper and Lower Connellsville regions at 399,142 tons, a gain over the previous week of 1889 tons.

Iron and Steel Scrap.—The scrap market is the weakest department in the whole list, prices having gone off 50c. a ton or more on nearly all grades. Some dealers seem to be pressing sales, evidently having scrap that has to be moved. Consumers appear to be congested with scrap and are out of the market as buyers or else are making offers that at this time dealers will not accept. We have reduced quotations on nearly all grades from 25c. to 50c. a ton. Dealers now quote, per gross ton, as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh, delivery	$15.00
No. 1 foundry cast	$15.00 to 15.25
No. 2 foundry cast	13.75 to 14.00
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.50 to 12.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.25 to 16.50
No. 1 railroad malleable stock	14.25 to 14.50
Grate bars	10.75 to 11.00
Low phosphorus melting stock	18.00 to 18.25
Iron car axles	24.25 to 24.75
Steel car axles	17.75 to 18.00
Locomotive axles, steel	21.75 to 22.00
Locomotive axles, iron	27.75 to 28.00
No. 1 busheling scrap	14.25 to 14.50
No. 2 busheling scrap	9.75 to 10.00
Old car wheels	15.75 to 16.00
*Cast iron borings	9.90 to 10.00
*Machine shop turnings	10.50 to 10.75
†Sheet bar crop ends	16.50 to 16.75
Old iron rails	16.25 to 16.50
No. 1 railroad wrought scrap	15.00 to 15.25
Heavy steel axle turnings	12.75 to 13.00
Stove plate	10.75 to 11.00

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Chicago

(By Telegraph.)

CHICAGO, ILL., November 20, 1912.

The question in the minds of many people as to whether the election has had any effect is being answered positively and unmistakably by the surprising volume of business that November is placing on the order books of steel companies and manufacturers in general. The pressure of immediate requirements for new business as well as for old continues to mount with no apparent break. Orders, specifications and shipments for the past week approximated the high-water mark. Orders for bars, plates and structural shapes to be used for car construction were placed during the week in excess of 30,000 tons. Rail tonnage was even greater, and track fastenings totaled not less than 20,000 kegs. Delivery of plates, sheets and bars in from four to six weeks is available from a very limited mill capacity only, and these sources are hampered by inadequate supplies of raw steel. Warehouse stocks are repeatedly exhausted of particular sizes of material by consumers who ordinarily depend upon mill shipments entirely. November promises to duplicate the exceptional record of the same month last year. Pig iron is rather quiet, but the market is very firm at $18 minimum for local iron and $14 for Southern. The existing situation as regards scrap continues to operate to the advantage of consumers.

(By Mail)

Pig Iron.—While the past few days have brought out several minor inquiries, among them one for 500 tons and another for 1000 tons, the preceding period was very quiet and little activity is expected the remainder of this year. Appearances indicate that the melters desiring to buy for future delivery have done so, while the others will be content to wait unless some marked change develops. For Southern iron $14, Birmingham, can still be done for this year and through the first quarter, although certain important interests are asking a minimum of $14.50 and are placing some tonnage at that price. For second quarter delivery, $14.50 is the minimum quotation. Local furnaces are asking $18 and $18.25 for first half delivery of No. 2 foundry, malleable Bessemer and basic iron. For high-phosphorus grades and special analysis iron, individual quotations are being made, sometimes at apparent concessions from the above prices. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being about 50c. a ton. Other quotations are for Chicago delivery. Prices on prompt shipment are as follows:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$18.75 to $19.75
Northern coke foundry, No. 1	18.50 to 18.75
Northern coke foundry, No. 2	18.00 to 18.25
Northern coke foundry, No. 3	17.50 to 18.00
Southern coke, No. 1 foundry and No. 1 soft	18.85 to 19.35
Southern coke, No. 2 foundry and No. 2 soft	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.35 to 17.85
Southern gray forge	16.85
Southern mottled	16.85
Malleable Bessemer	18.00 to 18.25
Standard Bessemer	19.40 to 19.90
Basic	18.00 to 18.25
Jackson Co. and Kentucky silvery, 6 per cent	20.40
Jackson Co. and Kentucky silvery, 8 per cent	21.40
Jackson Co. and Kentucky silvery, 10 per cent	22.40

Rails and Track Supplies.—There has been continued heavy contracting for rails, accompanied by liberal orders for track fastenings, including 4000 tons of angle bars and 14,000 kegs of spikes. Railroads appear to be anticipating their spring requirements of track fastenings, though this is ordinarily an off season. A traction line is inquiring for 1000 tons of girder rails. Sales of 5500 tons of Mayari Bessemer rails to three Western roads are noted, including some rails previously reported. The past few months the Pennsylvania Steel Company has been a factor in the rail business of this market to an unusual extent and has taken approximately 75,000 tons of open-hearth and Bessemer rails. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, $32 to $34.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Orders and specifications for structural shapes have been surprisingly heavy, and the fact that delivery of a considerable portion of the material ordered cannot be made until the latter part of next year seems to have had no deterring influence.

This is especially true of the tonnage that has been placed in connection with recent orders for cars. Contracts for fabricated steel placed during the week totaled approximately 6000 tons, including 1500 tons for an addition to the Webster Building, Chicago, awarded to the Noelke-Richards Iron Works, and 1500 tons for the Fort Dearborn Hotel, Chicago, awarded to the American Bridge Company. Other awards included 733 tons to the Kansas City Structural Steel Company for Sears, Roebuck & Co. at Kansas City; 364 tons to the Minneapolis Steel & Machinery Company for the Charles Gates residence at Minneapolis; 355 tons to the American Bridge Company for towers for the Pacific Gas & Electric Company, Cordelia, Cal.; 640 tons to the American Bridge Company, for the Chicago, Milwaukee & St. Paul Railroad; 382 tons to the Milwaukee Bridge Company for the same railroad; 305 tons to the Worden-Allen Company, for a plate shop for the Bucyrus Company, South Milwaukee, and 123 tons to the Wisconsin Bridge Company for the Inland Steel Company. We quote for Chicago delivery, mill shipment, plain shapes, 1.63c. to 1.83c.

Insistent demands for considerable quantities of certain sizes of angles and other structural shapes continue to tax the capacity of warehouse stocks. A recent agricultural implement order exhausted the local stocks of certain structural sections and apparently new demands are appearing as freely as at any time during the year. We quote for base sizes out of store, 2.05c.

Plates.—The placing of orders for plates to cover car and locomotive construction recently contracted for has been a large factor in making the past week one of the heaviest tonnage periods in the year. One interest alone has booked an aggregate of plate, structural and bar orders amounting to 30,000 tons. These orders are for delivery almost entirely in the last half of next year. The small amount of mill capacity for which orders can be taken promising delivery in from four to six weeks is commanding attractive prices, and 1.88c., Chicago, is easily obtained. We quote for Chicago delivery, mill shipment, 1.63c. to 1.88c.

Jobbers continue to be from ten days to two weeks behind in their handling of orders from stock and deliveries are being made on this basis. We quote for base sizes from store, 2.05c.

Sheets.—Local makers are practically out of the market except where specific needs of customers compel the booking of limited tonnages. Considerable business is being offered and is generally placed at maximum prices. Some of the independent mills, particularly those making special sheets, have not yet opened their books for next year, finding themselves able to operate at capacity on current orders at premium prices. Some sheet mills find themselves able to take more business than can be provided for with their own steel producing capacity, and slabs, billets and sheet bars are being purchased in the market. Prices are decidedly firm. We quote for Chicago delivery, in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c., and No. 10 blue annealed, 1.83c. to 1.88c.

While the demand for roofing sheets is likely to slacken at this season, the demand for power building and automobile purposes continues exceptionally heavy. A Detroit body maker in the last fortnight was compelled to buy from Chicago stocks every available ton of sheets suitable for that purpose. We quote on sheets out of store as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.80c., and No. 28 galvanized, 4.05c.

Bars.—In the local market bar iron is commanding a minimum price of 1.55c., while 1.60c. is not infrequently obtained. Special orders placed during the past week have brought as high as 1.65c. There is comparatively little new business for prompt shipment, but specifications on contracts and orders for forward delivery are almost record breaking in tonnage. New business in steel bars is generally placed on the basis of 1.45c., Pittsburgh, although 1.40c. continues to be the nominal price. There is very little hard steel bar tonnage available. We quote for mill shipment as follows: Bar iron, 1.55c. to 1.60c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 55 per cent. off.

Rivets and Bolts.—There has been a liberal placing of orders for structural rivets, but the larger portion of this business has not brought the recent advance of $2, one important local interest making no effort to obtain this higher price. Implement and wagon makers have also been in the market for bolts. We quote from mill as follows: Carriage bolts up to ⅜ in. x 6 in., rolled thread, 75-10-2½; cut thread, 75-7½; larger sizes, 70-5; machine bolts up to ⅜ in. x 4 in., rolled thread, 75-10-7½; cut thread, 75-10-2½; large sizes, 70-10; coach screws, 80-10; hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt. Structural rivets, ¾ to 1¼ in., 2.18c. to 2.28c.; base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ⅜ x 4 in., 70-12½; larger sizes, 65-10; carriage bolts up to ⅜ x 6 in., 70-10; larger sizes, 65-5 off. Hot pressed nuts, square head, $5.40, and hexagon, $6 off per cwt.

Wire Products.—Of the various forms of wire products, the demand for wire nails is particularly active and deliveries are falling somewhat behind specifications. There is also considerable pressure for shipments of woven wire fencing, particularly to the selling trade. We quote plain wire, No. 9 and coarser, base, $1.68 to $1.73; wire nails, $1.88 to $1.93; painted barb wire, $1.88 to $1.93; galvanized, $2.28 to $2.33; polished staples, $1.88 to $1.93; galvanized, $2.28 to $2.33, all Chicago.

Cast Iron Pipe.—There is little likelihood of any important municipal lettings of pipe before January, and gas companies, as well, are likely to defer buying until the New York appropriations have been made, despite the possibilities of a higher market. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $31; 6 to 12 in., $29; 16 in. and up, $28, with $1 extra for gas pipe.

Old Materials.—The pressure to sell, as contrasted with a limited demand from melters, continues to make the market sluggish and weak. Some of the leading consumers are unable to handle incoming material with sufficient dispatch and embargoes exist in several instances. In contrast with the general market, certain items show only a limited supply available, particularly old steel rails and old car wheels. It is unlikely that any considerable quantity of the former could be obtained at the price quoted. There is also a demand for agricultural malleable, in satisfying which some difficulty has been experienced. On the other hand, pipes and flues are particularly weak, an explanation for which may be found in the fact that material formerly absorbed in the St. Louis market is now shipped to Chicago. Railroad offerings of scrap are small and include 1200 tons by the Chicago, St. Paul, Minneapolis & Omaha, and a small quantity by the Soo Line. We quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$18.00 to $18.50
Old steel rails, rerolling	16.25 to 16.75
Old steel rails, less than 3 ft	14.50 to 15.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	16.75 to 17.25
Heavy melting steel scrap	13.50 to 14.00
Frogs, switches and guards, cut apart	13.50 to 14.00
Shoveling steel	13.00 to 13.50
Steel axle turnings	11.00 to 11.50

Per Net Ton.

Iron angles and splice bars	$16.00 to $16.50
Iron arch bars and transoms	17.00 to 17.50
Steel angle bars	12.75 to 13.25
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
No. 1 railroad wrought	13.25 to 13.75
No. 2 railroad wrought	12.25 to 12.75
Cut forge	12.25 to 12.75
Steel knuckles and couplers	12.50 to 13.00
Steel springs	13.25 to 13.75
Locomotive tires, smooth	14.00 to 14.50
Machine shop turnings	8.25 to 8.75
Cast and mixed borings	7.25 to 7.75
No. 1 busheling	11.50 to 12.00
No. 2 busheling	8.50 to 9.00
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	13.25 to 13.75
Stove plate and light cast scrap	11.00 to 11.50
Railroad malleable	13.50 to 14.00
Agricultural malleable	11.75 to 12.25
Pipes and flues	10.25 to 10.75

Philadelphia

PHILADELPHIA, PA., November 19, 1912.

A moderate volume of business, seasonable in character, has been moving in the various iron and steel products. Inquiry, particularly for advanced shipment, continues good, but makers are well sold up and as a rule confine acceptances to moderate lots for early delivery. The demand for car building material is more active, one inquiry for upward of 50,000 tons of plates, shapes and bars being noted. Prices of both iron and steel products are decidedly strong, with premiums frequently offered by consumers for early deliveries. The coke market has been quieter. The old material market has an

easier appearance, although prices have not shown any particular decline except in some rolling mill grades.

Iron Ore.—Few transactions of importance in foreign ores are reported. Heavy sales of Lake ores for 1913 delivery to Eastern furnaces are noted, the 1911 basis of prices prevailing. Negotiations for moderate lots are still pending, but sellers are not forcing business. The week's importations comprised 4500 tons of Canadian, 16,724 tons of Swedish and 14,950 tons of Cuban ore.

Pig Iron.—Fairly good business in foundry, rolling mill, forge and pipe making grades is noted. While sales have generally been of moderate lots an occasional round order has been closed. Considerable inquiry is in hand for both prompt and forward deliveries, but sellers are pretty well sold up as to the near future and most of them are not disposed to sell far ahead. A few exceptions are, however, to be noted in that sales for deliveries over the first half of next year have been made at prices both above and below those quoted for current delivery. Several 500-ton sales of No. 2 X foundry for shipment over the first half at $18.50, delivered, for standard analysis iron are reported, while for prompt or first quarter the same seller quotes $18.25. On the other hand the leading Virginia producer is selling No. 2 X foundry quite freely at $16, furnace, for first quarter, and $16.50 for second quarter. Transactions in Virginia foundry for early delivery have been principally small lots. For Virginia No. 2 X as high as $17, furnace, has been paid. Standard brands of eastern Pennsylvania No. 2 X are selling in moderate lots at $18.25 to $18.50, delivered. The Baltimore & Ohio Railroad is inquiring for some 2000 tons for first half, of which 800 tons of No. 1 and 300 tons of No. 2 X are for its Baltimore shops. The Baldwin Locomotive Works is asking prices on 1000 to 2000 tons of cylinder grade foundry for early delivery, while some moderate lot business in malleable is pending. The latter grade has recently sold in fair sized lots at close to $20, delivered. Low grade foundry continues in good demand. One Delaware River pipe maker has purchased 5000 tons for January-February shipment against a recent inquiry, the business being divided among several sellers at prices close to $17.75, delivered. Other Delaware River pipe makers are still in the market for low grade iron, which they would take at bargain prices. A Virginia pipe maker is also reported as being in the market for a round lot. The movement in rolling mill forge iron continues. One sale of 5000 tons, on which deliveries begin at once and extend into the first quarter, at close to $17.75, delivered, is noted, with several smaller sales. A further inquiry is out for 5000 tons for early 1913 delivery. The movement in steel making irons has been somewhat broader. Negotiations recently pending for 3500 tons of basic for central Pennsylvania delivery have been concluded, the price being just a shade under $18.25, delivered. An inquiry for a block of 5000 tons is now before the trade. Heavy sales of standard analysis low phosphorus pig have been made at higher prices; an aggregate of over 7000 tons has been sold, part for extended shipment at prices ranging from $24 to $24.50, delivered. The market generally is exceedingly strong and prices are decidedly firm. Deliveries on contracts are being taken freely, and producers show little disposition to crowd order books with business for extended deliveries at current prices, which for prompt and near future shipment in small and moderate lots, delivered in buyers' yards in this district, range as follows:

Eastern Pennsylvania No. 2 X foundry	$18.25 to $18.50
Eastern Pennsylvania No. 2 plain	18.00 to 18.25
Virginia No. 2 X foundry	18.80 to 19.00
Virginia No. 2 plain	18.55 to 18.75
Gray forge	17.75
Basic (nominal)	18.25 to 18.50
Standard low phosphorus	24.00 to 24.50

Billets.—The demand continues strong. Specifications are coming in freely, and mills in the East are less able to make prompt deliveries. In but few instances can makers accept business for early shipment. Prices are firm at $32, delivered here, for soft basic open-hearth rolling billets, while forging billets are quoted at $36 minimum, at mill, against ordinary analysis specification. Prompt shipments, when available, command sharp premiums.

Plates.—Eastern mills continue to receive a very good volume of businsse, mostly in moderate lots. Inquiries for heavy tonnages are being received from the West, particularly for car work, with considerable prompt delivery orders from Western consumers. A railroad is asking for 20,000 tons of plates for car work. Production in this district is steadily increasing, the Lukens Iron & Steel Company having made the largest output in its history last week. Prices continue firm. While some makers name 1.60c., deivered, for ordinary plates for future delivery, 1.75c. to 1.78c. represents the market for early shipment on sheared and 1.80c. to 1.83c. on universal plates, and premiums above these prices are offered for prompt shipment.

Structural Material.—There has been no diminution in the demand. A large volume of miscellaneous business is coming to the mills; specifications are also heavy and consumers are pressing for deliveries. Some mills are filled up tight for 10 to 12 weeks. Good inquiries for material for car and bridge work are being received, although building work in this district is quieter. A contract for 1200 tons for an addition to the Bergner & Engel Brewing Company's plant is reported closed. While plain shapes for uncertain delivery are in instances available at 1.60c., delivered, Eastern mills quote 1.70c. to 1.75c. for orders entered for ordinary delivery, 60 to 90 days.

Sheets.—A very active demand is reported. Western sheets are hard to obtain for early shipment and consumers are turning to Eastern mills for prompt supplies, although the latter are not often able to do better than four to six weeks. For such deliveries premiums of ¼c. to ½c. advance per lb. is usual. Specifications on all classes of sheets are coming out very freely. Western No. 10 blue annealed sheets are quoted at 1.80c., delivered here, although Eastern mills making smooth, loose-rolled sheets are in instances now quoting up to 2.05c. for reasonably early shipment.

Bars.—Eastern bar iron mills are running at full capacity and yet are not able to make satisfactory deliveries. Several idle mills in this district are preparing to go in, but find it difficult to obtain satisfactory supplies of labor. For ordinary shipment common iron bars are available at 1.67½c. to 1.77½c., delivered in this district, although prompt shipments command as high as 2c. Steel bars are being freely specified; on new business 1.55c. to 1.60c. is quoted, although prompt shipments command up to 1.85c., delivered here.

Old Materials.—The market has a somewhat easier appearance, although efforts to force lower prices have not been generally successful. Some holders of material, particularly small lots, have sold at the inside prices rather than to continue holding for higher figures. Several sales of moderate lots of No. 1 heavy melting steel, aggregating 4000 to 5000 tons, have been made at $15.50, delivered. Rolling mill scrap is easy in some and stiffer in other grades. No. 1 railroad wrought is sold at a slightly lower price, but borings are scarce and in active demand. Mills in this district are now pretty well supplied with old material. The following range of prices about represents the market for early deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate ranging from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel scrap and crops	$15.50 to $16.00
Old steel rails, rerolling (nominal)	17.00 to 17.50
Low phosphorus heavy melting steel scrap	19.25 to 19.75
Old steel axles	20.00 to 20.50
Old iron axles	26.00 to 27.00
Old iron rails	19.00 to 20.00
Old car wheels	15.00 to 15.50
No. 1 railroad wrought	17.00 to 17.50
Wrought iron pipe	14.00 to 14.50
No. 1 forge fire	13.50 to 14.00
No. 2 light iron (nominal)	8.00 to 8.50
Wrought turnings	11.50 to 12.00
Cast borings	11.50 to 11.75
Machinery cast	14.75 to 15.25
Grate bars, railroad	11.50 to 12.00
Stove plate	11.50 to 12.00
Railroad malleable (nominal)	13.50 to 14.00

Coke.—The demand for prompt furnace coke has been less urgent and prices have sagged. This grade for early delivery is now available at $3.75 at oven, and that price could probably be shaded. Contract furnace coke is quoted around $3. Prompt foundry coke has sold as high as $5 at oven, although $4.50 more closely represents the market, with contract foundry coke at $3.75 to $4. The following quotations, per net ton, delivered in buyers' yards in this district, are quoted:

Connellsville furnace coke	$5.00 to $6.00
Connellsville foundry coke	6.00 to 6.75
Mountain furnace coke	4.50 to 5.50
Mountain foundry coke	5.60 to 6.35

Ferroalloys.—Sales of small lots of 80 per cent. ferromanganese have been made for Western shipment, delivery over various portions of next year. It is also reported that a round lot for Eastern delivery has been sold for forward shipment. Quotations are still irregular and some producers have withdrawn from the market. For last half delivery $61, seaboard, is still named, while for first half $63 and first quarter $65

have been quoted. On prompt delivery up to $75 is named. Business in ferrosilicon has not been active and prices are unchanged.

Cleveland

CLEVELAND, OHIO, November 20, 1912.—(*By Telegraph.*)

Iron Ore.—Ore prices for 1913 delivery were established Tuesday by sales of round lots at 10c. a ton lower than the 1911 prices, or an advance of 65c. on Bessemer grades and 55c. to 60c. advance on non-Bessemer grades as compared with 1912 prices. The reduction of 20c. in the railroad freight rate from Mesaba mines this year gives sellers an advantage of 10c. a ton on Mesaba ore as compared with 1911. A change in the base by lowering the guarantee of iron content, which has been under discussion, will not be made. Sales are reported during the day aggregating about 3,000,000 tons. Contracts for the heavy tonnage previously reserved will be drawn up on the new basis. The new prices are as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

(By Mail)

As predicted early in the year the present season has been an unsatisfactory one to many of the mining companies in spite of the heavy ore sales. Some have made only a slight profit and some mines have been operated at a loss. The opinion is quite general among ore men that this year's prices were too low, and they point out that with the restoration of the 1911 prices net returns will be less than in that year, for the reason that the cost of mining supplies has been advanced considerably and changes in the Michigan and Minnesota tax laws have increased the tax on ore shipped from 5c. to 30c. a ton, the advance depending on the amount of ore in the mine. In addition Lake carrying charges, which were reduced this year, may be put back to the 1911 basis and there is a possibility of mine laborers demanding higher wages. With Bessemer grades previously well cleaned up under reservations there was considerable non-Bessemer ore reserved in the week and inquiries are still coming out. With good weather conditions during the present month ore firms are well cleaned up on shipments and few cargoes will be shipped after this week. The Pittsburgh Steamship Company has sent its last boats up the Lakes and these will go into winter quarters as soon as they come down with their cargoes. No ore will be shipped after November 30.

Pig Iron.—The market is very firm and more active than during the previous week. Sales of considerable Bessemer and basic iron to Valley interests for the first quarter delivery are reported. Local prices on foundry grades have advanced and $17.50, furnace, is now the minimum quotation for No. 2. Only a few small lot sales are reported, but there are several inquiries for lots up to 1000 tons. A local interest reports numerous small sales aggregating about 4000 tons for shipment from the Valley at $17.50 for No. 2. Sales of malleable iron are being made in the Valley at the same price. There is some demand for foundry iron for prompt shipment. Some sellers have nothing to offer for early delivery, and others are out of the market for the reason that they can secure only enough cars for their regular shipments. This condition has resulted in the sale of Southern Ohio iron to northern Ohio consumers at $17, furnace, or over $18.50 delivered. We note one sale of 100 tons at that price for shipment to a Valley point. For prompt shipment and for the first half of 1913 we quote, delivered Cleveland, as follows:

Bessemer	$17.90 to $18.40
Basic	17.40
Northern No. 2 foundry	17.75 to 18.00
Southern No. 2 foundry	18.35 to 18.60
Gray forge	17.00 to 17.25
Jackson County silvery, 8 per cent. silicon	20.55 to 21.55

Coke.—There is some demand for small lots of foundry coke for prompt shipment and sales are being made at $4.65 to $4.75 per net ton at oven. Makers are asking $4 to $4.65 for contract. Furnace coke is being quoted at $4 to $4.50 for prompt shipment and $3.25 to $3.50 for the first half.

Finished Iron and Steel.—The new demand is active, but consumers are having trouble in buying material for delivery in the first half, as few mills have anything to offer for shipment before July. Some contracts are being placed at 1.40c. to 1.45c. for steel bars and 1.45c. to 1.50c. for plates and shapes for delivery at the convenience of the mill. Little material for early delivery is offered except from jobbers' stocks. The new demand for structural material is more active than for some time. T. H. Brooks & Co., Cleveland, have taken 1400 tons for a 14-story office building to be erected by the Cleveland Electric Illuminating Company. The Lake Shore Railroad will require about 2000 tons, partly nickel steel, for a new lift bridge in Chicago. An addition to the plant of the Atlantic Foundry Company, Cleveland, will take 400 tons and new buildings to be erected by the Hydraulic Pressed Steel Company, Cleveland, will take 100 tons. The city of Cleveland will receive bids November 26 for building a new pumping station that will take 140 tons. The Great Lakes Dredge & Dock Company has been given the contract for new docks to be built by the Hocking Valley Railroad Company at Toledo. This work will require 200 tons of reinforcing bars, but it is not expected that the company will purchase the 700 tons of piling required, as it already has a supply available. A local manufacturing concern is in the market for 6000 tons of sheared plates for specific work, only a small portion of which will be for delivery before July. There is a good demand for iron bars, but local mills have little tonnage to offer, as they are running largely on steel bars to supply warehouse orders and contracts. We quote iron bars at 1.55c. to 1.60c., Cleveland. The demand for sheets is quite active and independent mills generally are making sales at $2 a ton above regular quotations. Owing to the active demand for light rails the leading interest is now not able to make deliveries within about 60 days. Rivet manufacturers have made another advance to 2.10c. for structural rivets and 2.20c. for boiler rivets. The city of Cleveland has granted a new franchise to the East Ohio Gas Company, which means that that company will shortly go ahead and lay another natural gas line between Cleveland and its West Virginia fields. This will require approximately 150 miles of 20-in. steel pipe. Warehouse prices are unchanged at 1.95c. for steel bars and 2.15c. for shapes and plates.

Old Material.—There is very little inquiry and the market is weak. Local mills have their yards well filled as well as considerable amounts under contract, and as other consumers in the Ohio territory are generally in about the same condition dealers look for very little activity within the next 30 days. Dealers seem inclined to hold their scrap until the market stiffens up again and are not offering a great deal at price concessions. One Cleveland consumer is offering $13.50 for heavy melting steel, but it is doubtful if any scrap can be bought at that price. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.	
Old steel rails, rerolling	$15.00 to $15.50
Old iron rails	17.50 to 18.00
Steel car axles	18.75 to 19.25
Heavy melting steel	14.00 to 14.50
Old car wheels	13.50 to 14.00
Relaying rails, 50 lb. and over	23.00 to 23.50
Agricultural malleable	12.50 to 13.00
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	12.50 to 13.00
Per Net Ton.	
Iron car axles	$21.00 to $22.00
Cast borings	8.25 to 8.50
Iron and steel turnings and drillings	9.00 to 9.25
Steel axle turnings	9.25 to 9.50
No. 1 busheling	12.00 to 12.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 cast	13.00 to 13.50
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, November 20, 1912.—(*By Telegraph.*)

Pig Iron.—Furnaces in the Hanging Rock district are firm in holding out for $17, Ironton, for either prompt or first quarter shipment. This price can be shaded for this year's delivery, but it is doubtful if it can be bettered for first half business. There is a quantity of resale iron obtainable at $16.50, Ironton basis, but it is not enough to influence the market. While the nominal quotation on Southern No. 2 foundry is $14, Birmingham basis, there were a few transactions covering small quantities around $13.50 for this year's delivery. The majority of producers are, however, selling at a higher figure, and it is not possible to make any first half contracts below $14 to $14.50, and two large interests are holding out for $15 at furnace. Business continues to come in principally through the direct solicitation of salesmen, and is closely confined to small orders. The reports received from outside offices would indicate that local pig iron houses received orders for larger tonnages from both the St. Louis and Chicago territories than from this immediate section. A Michigan consumer is expected to close soon for 500 tons of Northern charcoal iron and from the same territory there are two inquiries for approximately 1000 tons each of foundry iron for first half. There is a small

inquiry for malleable from an Indiana manufacturer. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$17.50 to $18.00
Southern coke, No. 2 foundry and 2 soft	17.25 to 17.50
Southern coke, No. 3 foundry	17.00 to 17.50
Southern, No. 4 foundry	16.75 to 17.25
Southern gray forge	16.50 to 17.00
Old silvery, 8 per cent. silicon	20.20 to 20.70
Southern Ohio coke, No. 1	18.70 to 19.20
Southern Ohio coke, No. 2	18.20 to 18.70
Southern Ohio coke, No. 3	17.95 to 18.45
Southern Ohio malleable Bessemer	17.70 to 18.20
Basic, Northern	18.20 to 18.70
Lake Superior charcoal	19.25 to 19.75
Standard Southern car wheel	25.75 to 26.25

(By Mail)

Coke.—A local firm was compelled to pay $4.25 per net ton at oven for a small quantity of foundry coke for prompt shipment to take care of one of its customers. This same condition exists in practically all three producing districts, and as high as $4.50 per ton for 72-hr. coke has been obtained on several special brands. There are practically no quotable figures to be given out for this year's shipment, and 48-hr. coke has, in a few instances, brought as high a price as foundry coke. For first half it is probable that as low as $3.25 might be done on furnace coke, but $3.50 is nearer the figure that oven operators are holding out for. All the way from $3.75 to $4 is asked for foundry coke, and these prices prevail in all three producing fields. There is continued complaint as to delayed shipments, especially from a number of the larger foundries.

Finished Material.—The open weather has tended to keep up the demand for both structural material and sheets for roofing and siding purposes. The question of delivery on time is a matter that has troubled both local dealers and manufacturers. The local mill is now quoting No. 28 black sheets at 2.35c. and galvanized at 3.50c., Pittsburgh basis, and is unable to promise shipment to suit quite a number of its customers. The local warehouse price on structural material, cut to lengths, when desired, is 2.25c. and on steel bars 2.15c. Taking everything as a whole, the market is strong and there are no indications in this territory of any let-up in the demand for any class of finished material in the immediate future.

Old Material.—The light demand and weakness in market quotations continue, and while there is not likely to be any decided break, it is not probable that there will be any material change for the better within the next few weeks. Heavy buyers of scrap are understood to be fairly well stocked, and the mills also have a sufficient quantity contracted for to run them for a short period. The figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	$10.50 to $11.00
Old iron rails	14.75 to 15.25
Relaying rails, 50 lb. and up	21.75 to 22.25
Rerolling steel rails	13.75 to 14.25
Melting steel rails	11.75 to 12.25
Old car wheels	13.25 to 13.75

Per Net Ton.	
No. 1 railroad wrought	$11.75 to $12.25
Cast borings	7.75 to 8.25
Steel turnings	8.25 to 8.75
No. 1 cast scrap	11.50 to 12.00
Burnt scrap	8.25 to 8.75
Old iron axles	18.75 to 19.25
Locomotive tires (smooth inside)	12.25 to 12.75
Pipes and flues	8.25 to 8.75
Malleable and steel scrap	9.75 to 10.25
Railroad tank and sheet scrap	7.25 to 7.75

Birmingham

BIRMINGHAM, ALA., November 19, 1912.

Pig Iron.—We have had the quietest 10 days in this market in two months, the transactions having been in small quantities. The largest heard of was 2000 tons of No. 2 foundry for first quarter at $14.50. The minor lots of $13.50 iron mentioned in some quarters was resale iron, and the price cuts no figure in the general market. Tennessee furnaces have advanced to $14, although enjoying a smaller freight rate than the Birmingham furnaces. Effort to deliver iron contracted for and anxiety to receive it on the part of the consumer constitute the market's dominant features. One large dealer sold but 400 tons in a week, all going in small lots at $14.50 for spot and first quarter, his books not being open for second quarter yet. No change has been made in prices, nor is there indication of any, both sides resting on that score. The situation continues to be as follows: The leading interest has a considerable tonnage at $14.50 and $15 for first and second quarters respectively; another large maker names $14 for spot and first quarter and $14.50 for second quarter, with $14.25 for orders covering the entire first half; another quotes $14 for spot, $14.50 for first quarter and $15 for second; a fourth has only $14.50 iron and is not scheduling for second quarter. The lull in the market is easily accounted for by the considerable bookings of consumers and the small amount of iron available on the part of the furnace interests. Special brands desired by certain customers fetch $15 for spot delivery. The home foundry demand is at high tide, especially on the part of the water pipe makers, while steel mills at Bessemer, Ensley and Gadsden are reported as booked for several months ahead. Prices, f.o.b. cars at Birmingham, continue as follows:

No. 1 soft and foundry	$14.50
No. 2 soft and foundry	14.00
No. 3 foundry	13.75
No. 4 foundry	13.50
Gray forge	13.25
Basic	14.00
Charcoal	25.00

Cast Iron Pipe.—Shipments from foundries are especially heavy, while the influx of orders is large. Additional orders have come from Kansas City and other Western points. Prices, per net ton, f.o.b. cars at Birmingham, continue to be $25 for 4-in. and $23 for 6-in., with $1 added for gas pipe. The tendency is to advance, and small filling in orders command a premium of about $1.

Coal and Coke.—The car shortage has forced a number of large mines to shut down for several days at a time and steam coal has advanced in price. Coke is in strong demand at $3.50 to $3.75 per net ton at oven. The demand both for coal and coke is greater than the apparently available supply.

Old Material.—The market continues strong and with a considerable volume of business going. Wrought and steel grades are in special demand. The price schedule fixed by the dealers is maintained on orders booked and is as follows, per gross ton, f.o.b. cars at Birmingham:

Old iron axles	$16.50 to $17.50
Old steel axles	15.50 to 16.00
Old iron rails	14.50 to 15.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	11.50 to 12.00
No. 1 heavy melting steel	11.50 to 12.00
Tram car wheels	12.00 to 12.50
Standard car wheels	13.00 to 13.50
Light cast and stove plate	9.50 to 10.00

St. Louis

ST. LOUIS, MO., November 18, 1912.

Pig Iron.—Specifications continue to come in steadily with the result that furnace representatives are kept busy looking after shipments. New business has been chiefly in small lots, though a few larger sales were announced, the principal one being 500 tons of Southern No. 2 for last quarter delivery. Furnace representatives here ascribe the present quietude to the fact that most consumers have supplied themselves pretty well. Quotations show no change. Figures are being very firmly held and furnaces are evincing an indisposition to make any more contracts except at their own terms as to price and delivery. So far as can be determined here there is no political effect on the market.

Coke.—Quotations show no change and conditions are such as to keep large contracts out of the market until deliveries can be assured and prices have become steady and more satisfactory than is now the case. The only business coming out is that of small lots for peremptory needs.

Finished Iron and Steel.—The market has shown no cessation in specifications on contracts and very little if any new business. Demand for shipment promptly is more and more accentuated. Both the car shortage and the labor shortage are affecting conditions. In structural shapes and in bars for reinforcing purposes March and April delivery is reported as the best now with no promises of that even. Plates are five to six months off in delivery. Track fastenings are in good request for the season and firm at the recently noted advance. The agricultural machinery and wagon interests are reported busier than ever and the fabricating shops are showing no decrease of demand. Light

rails are in good request from the coal interests and the lumber people are buying quite freely with indications of heavier demand later.

Old Material.—There is a firmer tendency with some advances. The demand has become brisker and the mills are taking considerable quantities and are reported as anxious for more. The relaying material market is still in a swept-clean condition with the demand good at the prices quoted, while urgent demands are made for quick shipment on orders placed. In general the scrap market is in a very satisfactory condition. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$15.50 to $16.00
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than three feet	15.00 to 15.50
Relaying rails, standard section, subject to inspection	24.00 to 25.00
Old car wheels	15.50 to 16.00
Heavy melting steel scrap	15.00 to 15.50
Frogs, switches and guards cut apart	14.50 to 15.00

Per Net Ton.

Iron fish plates	$12.50 to $13.00
Iron car axles	20.50 to 21.00
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.00 to 12.50
Railway springs	12.25 to 12.75
Locomotive tires, smooth	13.00 to 13.50
No. 1 dealers' forge	10.00 to 10.50
Mixed borings	8.00 to 8.50
No. 1 busheling	11.00 to 11.50
No. 1 boilers cut to sheets and rings	8.50 to 9.00
No. 1 cast scrap	12.50 to 13.00
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.00 to 11.50
Pipes and flues	8.50 to 9.00
Railroad sheet and tank scrap	8.00 to 8.50
Railroad grate bars	10.00 to 10.50
Machine shop turnings	9.00 to 9.50

Buffalo

BUFFALO, N. Y., November 19, 1912.

Pig Iron.—New business has not been heavy, totaling only about 12,000 tons of all grades, but shipments on contracts have been extraordinarily heavy. One of the leading producers states that its shipments for the past month have aggregated more than twice the amount forwarded during the corresponding period of last year. Many foundries are taking their delivery quotas far in advance of contract schedules, at least to the extent that furnaces are able to respond to requests for advance shipments. The smaller total of business booked is not attributable to a subsidence in demand, but rather to the limited available tonnages the furnaces have for sale. The product which they still have to dispose of easily commands top prices. There is nothing in the situation to indicate a lessening of demand or a softening of prices, which are now absolutely rigid. We quote as follows, f.o.b. Buffalo, for current quarter and first half delivery:

No. 1 foundry	$17.50 to $18.00
No. 2 X foundry	17.25 to 17.50
No. 2 plain	17.00 to 17.25
No. 3 foundry	17.00
Gray forge	16.75 to 17.00
Malleable	17.50 to 18.00
Basic	17.50 to 18.00
Charcoal, regular brands and analysis	18.75 to 19.25
Charcoal, special brands and analysis	22.00

Finished Iron and Steel.—Miscellaneous inquiry is in excess of mills' capability to care for it. Specifications, although coming in freely, are not quite so large in volume as for some time past. One reason for this is that customers have already specified the full amount of existing contracts ahead of contract schedules and the mills are not in a position to take on additional contracts for deliveries before the close of the second or forepart of the third quarter. The majority of the mills are still scheduled ahead for five to seven months. The minimum price on steel bars continues at 1.40c., Pittsburgh base, with plates and shapes at 1.50c. One sales agency, however, is now naming 1.45c. for such new business in bars as it can accept. Cold rolled steel is held at 60 per cent. discount; carload lots and wire nails, $1.70 to $1.75, Pittsburgh base. The bar mills of the principal local producer are running double turn in all instances where they have sufficient semi-finished steel to keep all mills going. In fabricated structural lines the week has shown increased activity and considerable new business is nearly ready for figures. The Pennsylvania General Electric Company, Erie, Pa., has placed contract with the Riter-Conley Mfg. Company, Pittsburgh, for steel work for the extensive addition to be made to its factory building No. 10 requiring about 1500 tons. The structural steel work for a baseball cage and grand stand at Binghamton, N. Y., has been let to the Williams Bridge Company, Syracuse.

Old Material.—The market is rather quieter than it was last week, with slightly smaller volume of transactions. Shipments of good proportions are, however, going forward on contracts to mills and foundries. The price schedules show no change from last week. We quote as follows, f.o.b. Buffalo:

Heavy melting steel	$14.75 to $15.25
Low phosphorus steel	17.00 to 17.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 railroad and machinery cast scrap	14.00 to 15.00
Old steel axles	16.75 to 17.00
Old iron axles	24.50 to 25.00
Old car wheels	15.50 to 16.25
Railroad malleable	13.50 to 14.00
Boiler plate, sheared	15.00 to 15.50
Locomotive grate bars	11.75 to 12.25
Wrought pipe	10.50 to 11.00
Tank iron	10.75 to 11.25
Wrought iron and soft steel turnings	8.75 to 9.00
Clean cast borings	8.00 to 8.50

Boston

BOSTON, MASS., November 19, 1912.

Old Material.—The market is firm at the slight reduction noted last week. Offerings are fairly large, as is always the case with the approach of winter. The quotations given below are of prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$12.25 to $12.50
Low phosphorus steel	14.00 to 15.00
Old steel axles	15.00 to 15.50
Old iron axles	23.00 to 23.50
Mixed shafting	14.75 to 15.25
No. 1 wrought and soft steel	12.25 to 12.75
Skeleton (bundled)	10.75 to 11.25
Wrought iron pipe	10.75 to 11.00
Cotton ties (bundled)	10.75 to 11.00
No. 2 light	4.50 to 5.00
Wrought turnings	8.50 to 8.75
Cast borings	8.00 to 8.50
Machinery, cast	13.50 to 14.00
Malleable	11.00 to 11.50
Stove plate	9.00 to 9.50
Grate bars	8.00 to 8.25
Cast-iron car wheels	13.50 to 14.00

San Francisco

SAN FRANCISCO, CAL., November 12, 1912.

A slight curtailment of specifications is noted in some departments, particularly those on which delivery can be made before January 1. The general demand, however, shows little decrease from that of last month, and specifications are expected to increase toward the end of the year. Plenty of new business is offered for next year, and considerable difficulty is encountered in placing it, though in some lines large buyers have covered their requirements through the second quarter. While a heavy tonnage is arriving on old orders, stocks are low, and many large consumers who usually depend on direct shipments are now buying from store. The current consuming demand is strong, and while some curtailment is expected during the winter there are indications that supplies will be considerably below requirements.

Bars.—With an unusually heavy jobbing movement and no sign of improvement in deliveries, specifications for soft steel bars continue on about the same scale as for some time past. Contracting for first and second quarters has been quite general, but supplies in store are very light, and estimates of winter requirements are much larger than last year. Small orders for reinforcing bars continue numerous, and the prospective tonnage is very heavy, large orders being expected for Exposition work during the year. Figures are also being taken on two new sections of concrete seawall, aggregating about 1700 ft., and Los Angeles has taken bids on another lot of bars for the aqueduct. Soft steel bars in small lots, from store, San Francisco, are quoted at 2.65c., and iron at 2.55c.

Structural Material.—California building records for October showed a very satisfactory gain over last year and while the north coast cities made a poor showing there are now indications of a revival there. Local

business coming out at present includes little that is attractive to Eastern fabricators, consisting mainly of unimportant jobs, though the total tonnage is fair. A large amount of work is on the boards, some of which is expected to come up in the next 60 days, while many projects of some importance are held up pending financial arrangements. It is reported that architectural work has been started on the municipal auditorium. Bids are in on the Stewart Hotel, this city, about 300 tons, and the general contract has been let for the Travelers' Hotel, Sacramento. Figures are also being taken on the Davenport Hotel, Spokane, Wash., about 3500 tons, and a large club building is projected in that city. Preliminary contracts have been let for the Lake Washington canal bridge, Seattle, Wash. Probably the largest local job to be figured this month is the Labor Temple at Sixteenth and Capp streets, requiring about 900 tons. The Western Iron Works has the Schaw-Batcher shop contract in South San Francisco, and contracts have been let for the same concern's hardware store at Sacramento.

Rails.—While no especially notable orders have been placed by coast railroads this month, the volume of small business is keeping well up to recent average, and an active movement is expected during the spring. Interurban and logging road construction projected would require a heavy tonnage, but there is no certainty as to when contracts may be let, as practically all the work in view is contingent upon new financing. The Santa Fe is preparing to start work on its Oakland waterfront yards, and the Modesto Interurban Railroad is making new surveys in the San Joaquin Valley. The Diamond Match Company is surveying for a 30-mile logging road above Stirling City.

Sheets.—Specifications are a little lighter, but renewed activity is expected in a few weeks, and every effort is being made to get shipments on orders already sent in. Few agents are able to take any additional business for this year, and the majority decline to make commitments for next year. The jobbing trade in all lines of sheets is well maintained, and some manufacturers are seriously hampered by slow deliveries.

Plates.—No business of special interest in tank or pipe work has come out this month, though additional inquiries in this line are expected before long. The requirements of shipbuilding plants at various coast points are well above the average of recent years, and still greater activity in marine construction is expected next year. The steady demand from the small trade is rapidly reducing supplies in store, and merchants as well as contractors on large pipe jobs are anxiously awaiting shipments.

Merchant Pipe.—Specifications are hardly as heavy as last month, as orders already sent in will about cover requirements until the end of the year, though stocks on hand are light and considerably broken up. Renewed activity is expected before the end of the month. While some decrease in consuming demand is likely during the winter, it has so far been unusually well maintained. The oil country business, however, appears to have settled down to the usual winter quiet, the larger interests having purchased all that will be required for the season's drillling.

Cast Iron Pipe.—A few municipal inquiries are coming out, and agents are still hopeful of a revival before the end of the year. The town of Pasadena, Cal., is in the market for a lot of high-pressure pipe, and Salem, Ore., is figuring on about 75 tons. A plan is under consideration to extend the local high-pressure system through the Exposition grounds. Prices per net ton, f.o.b. San Francisco, remain at $38.50 for 4-in.; $36.50 for 6 to 10-in., and $36 for larger sizes.

Pig Iron.—English and Continental iron purchased at lower prices is in free supply and valued on a somewhat lower basis than the present quotation for No. 2 Southern foundry iron. The latter, however, receives some attention, a number of small lots having been ordered of late, the price delivered here being $24.60 per net ton.

Coke.—With liberal supplies of foreign coke, the movement is almost entirely in small lots, values standing as before. The spot offering of Albama coke is about cleaned up, and agents are now taking orders for shipment on the basis of Birmingham quotations, amounting to about $11.50 f.o.b., San Francisco, per net ton. Pelton Main and German Syndicate coke, ex yard, is quoted at $14 per gross ton

Old Material.—The local market is in very fair shape, except for cast iron scrap, which is neglected. Large sales of steel melting scrap are reported for shipment to Colorado, and local buyers show increasing interest in the market. Relaying rails and second-hand pipe are in especially strong demand, several cars of the latter having been brought in from Pittsburgh. Values are unchanged as follows: Cast iron scrap, per net ton, $15; steel melting scrap, per gross ton, $12.50; wrought scrap, per net ton, $12.50 to $15; rerolling rails, per net ton, $11.

The British Market Stronger

Pig Iron Advances and Steel Firm—Standard Oil Inquiry

(By Cable)

MIDDLESBROUGH, ENGLAND, November 20, 1912.

Pig Iron is stronger, with more buying. Welsh steel works are having great difficulty in getting deliveries of German hematite iron and intermittent operations result. Stocks of Cleveland pig iron in store stand at 253,460 tons—a change of less than 200 tons in the week. Welsh tin plate bars continue very scarce and £6 2s 6d has again been paid for prompt delivery. Welsh semi-finished steel is very firm and there is more inquiry. The Standard Oil Company is inquiring for tin plates but Welsh prices are considered too high. For Victoria 16,000 tons of rails have been booked by Eastern mills. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 68s. ½d., against 66s. 9d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 68s. 6d., an advance of 1s. 3d. in the week.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 17s. 6d. for January-March delivery.

German sheet bars, f.o.b. Antwerp, 110s.

German 2-in. billets, f.o.b. Antwerp, 105s.

German basic steel bars, f.o.b. Antwerp, £6 4s.

Steel bars, export, f.o.b. Clyde, £8, an advance of 2s. 6d.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 10s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yard, £8 2s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 15s. 4½d.

German Prices Advancing

Pig Iron in Urgent Demand

BERLIN, November 7, 1912.

The report given out yesterday by the Düsseldorf Exchange says that the urgent demand for pig iron continues, but that other sections of the trade have become quieter in consequence of the political situation; also that prices remain good and calls for delivery satisfactory, but the shortage of cars causes great delays in shipments. Prices of pig iron were advanced one mark and are now as follows: Spiegeleisen, 82 marks for 10 to 12 per cent.; Rhenish-Westphalian spiegeleisen, 69 marks; Siegerland steel making grades, 72 to 73 marks; Rhenish-Westphalian steel making grades, 74 to 75 marks; German Bessemer, 81.50 marks; Luxemburg No. 3 foundry, 63 to 65 marks; German No. 1 foundry, 77.50 marks; No. 3, 74.50 marks; German hematite, 81.50 marks, and English hematite, 98 to 100 marks.

Blast furnaces are working to their utmost capacity and are hardly able to fill orders on time. Foreign markets are calling briskly for iron due on contracts and have also recently placed considerable new orders. The Russian Government has just decided to lower the duties on pig arriving from the Silesian district, which will further increase the export movement. The market for scrap remains rather quiet, but prices are now steady; consumption continues heavy, and such amounts as are coming upon the market are readily absorbed.

Record Production of Pig Iron

Pig iron production for October showed a big increase and created a new record. It amounted to 1,589,000 metric tons, beating the previous high record, that of August, by nearly 102,000 tons, and that of October, 1911, by 254,000 tons. This is due to the fact that several new furnaces were blown in during the month.

The position of the market for semi-finished steel continues highly favorable. The calls for delivery on order are on such a large scale and often so urgent that the mills find it impossible to ship as demanded. Consumers complain generally of scarcity of steel, and sometimes manufacturers of finished products have to shut down till material arrives. The uncommon shortage of cars on the State railroads, reaching often as many as 7000 cars a day in the Essen region, is a great impediment to the iron companies at this juncture of extraordinarily heavy production and consumption. The big new works in Luxemburg and Lorraine are suffering especially from the car shortage. Predictions are heard that the 1913 prices for semi-finished steel will be raised 2.50 to 5 marks a ton. In beams and other structural forms higher prices are also expected. Foreign markets continue to buy in good amounts at satisfactory prices.

Finished Products Strong

Most mills running on bars have work in hand till the end of next June, and specifications extend three to four months ahead. The mill price is still maintained at about 125 marks as minimum. Bands are in a strong position; it transpires that the price of cold-rolled bands is 210 marks, not 205 as at first stated. Hot-rolled bands are in good demand for export at 148.50 marks, f. o. b. North Sea port.

Plates remain extremely active, and the mills are unable to meet the wishes of consumers promptly enough. Ship plates continue to be called for very briskly by both home and foreign markets. The mills are getting about as good prices abroad now as at home. According to advices from Dortmund, it is expected that the Heavy Plate Convention will be dissolved at the end of the year. Such important establishments as Phönix and Gutehoffnungshütte drew out of it early in the year. It is not expected that the dissolution will affect prices in view of the extremely heavy orders on hand. Business is very good; the export trade is calling for increased amounts.

Wrought pipe is in an extraordinarily strong position. From the Silesian district it is reported that manufacturers are so heavily supplied with orders that they are refusing many foreign offers; and it is expected that sales for 1913 delivery will be at an advanced price. From the Essen district it is reported that efforts of a hopeful character are making toward giving the trade an effective organization. Some of the most important concerns have already given their consent to enter it. The Mannesmann Röhrenwerke, which has almost attained the position of a trust in this section of the trade, has just elected one of the Krupp directors to a place on its board—a fact which is much commented upon as denoting that a close business arrangement between the two concerns now exists.

Association News in Several Lines

Wire rod mills are very busy, and the organization continues to assign orders to the mills in excess of their allotments. Another meeting of the manufacturers was held yesterday to try to get an agreement to prolong the association, but the result has not yet been made known. Some of the mills are making the organization of the wire nail trade a condition for the prolongation of the Rod Association, so that the price cutting in that product may be stopped. In fact, an agreement has been reached for a wire nail combination, and another meeting will be held about the middle of the month for perfecting the details; meanwhile the support of several other concerns is to be solicited. It may be predicted with certainty that the new organization will at once adopt better prices, present ones being considerably too low. The minimum price for drawn wire is 14.25 marks per metric cwt., while that of wire nails is only 13.75 to 14 marks.

The manufacturers of steam boilers held a meeting at Dortmund last week at which it was stated that the shops were extraordinarily busy. No agreement as to prices was made, but the general tone of reports was that the price situation was strong.

A meeting of the Society of Machine Tool Builders has just been held, at which it was reported that the shops are having plenty of work this year. Exports of machine tools for the first nine months of the year amounted to 55,258 tons, against 44,659 tons for the like period of 1911. This increase in exports, however, is at the cost of prices, sharp concessions having been made. The shops have good orders for some time ahead.

The shipments of the Steel Works Union in October reached 531,000 tons, or 20,000 tons more than in September.

New York

NEW YORK, November 20, 1912.

Pig Iron.—The market is quiet but generally firm. Several inquiries of considerable size are still pending. The smaller and medium-sized foundries seem to be well supplied with iron, particularly those in New England, but in New York State a number of inquiries are up which indicate that more iron will be needed in 1912 than had been estimated. Business is reported with New Jersey foundries in lots of 100 to 250 tons. An important company with plants in different parts of the country, which bought a round lot recently, has been inquiring for 2000 to 3000 tons additional for Eastern plants. Not more than 400 to 500 tons of this has been bought and the company is now disposed to wait. Occasionally there is a disposition to hold off a little longer in covering for the second quarter of next year, the feeling being that there has been a good-sized advance and that on the present basis it is not particularly advantageous to load up for a long term. The leading Virginia producer has announced that it has no further No. 2 X iron to offer for delivery before July 1, 1913. One of the three furnaces which it has been operating, Crozer No. 2, was compelled to stop recently because of an accident, and is likely to be down for a considerable time. This company has been quoting No. 2 X at $16, furnace, for early delivery and $15.50 for second quarter. Furnaces in the Buffalo district are very well sold up and have not much iron to offer either for this year or the first quarter. They are quoting $17 and upward for No. 2 X at furnace. Inability to get coke is holding at least one furnace in the Buffalo district out of commission. While very little Alabama iron comes into Eastern districts, it is reported that $14, Birmingham, is not strictly maintained as minimum for No. 2 foundry iron. There are indications in the East also that some of the high quotations recently made by eastern Pennsylvania furnaces are not realized in actual transactions. We quote as follows for Northern iron at tidewater: No. 1 foundry, $18.50 to $18.75; No. 2 X, $18 to $18.25; No. 2 plain, $17.25 to $17.75. Southern iron is quoted at $18.50 to $18.75 for No. 1 foundry and $18 to $18.25 for No. 2.

Structural Materials.—There is a slight lull in new buying. The week's contracts, however, total up well and the market promises considerable business, the New York Central, for example, in connection with its New York terminal requiring perhaps 25,000 tons, although this may be distributed over two years; and the promised railroad buying seems to be becoming a fact. The Levering & Garrigues Company, in addition to the work reported last week, has taken a contract for a garage for the American Express Company, West Forty-fourth street, 1200 tons, and two buildings for the Boston Fish Market Commission, 1150 tons. Other awards of size include 3200 tons for the Delaware, Lackawanna & Western's 1913 requirements, given to the American Bridge Company; for Solvay Process Company, Detroit, 2100 tons, to the Riter-Conley Mfg. Company; Cruikshank Building, Fourth and Gansvoort streets, 1100 tons, to the Hay Foundry & Iron Works; loft at 245 West Fifty-fifth street, for the Aeon Realty Company, to the Alfred E. Norton Company; apartment, West Ninety-second street, to the Hinkle Iron Company; bridge for the New York Connecting Railroad, 300 tons, and 50 tons for the Pennsylvania on the Pittsburgh division, both to the Pennsylvania Steel Company; Philadelphia & Reading bridge at Mahanoy City, 250 tons, to the McClintic-Marshall Construction Company, which also is to erect a 250-ton bridge for the Pennsylvania near Pittsburgh; New York Central terminal area, 250 tons, to the Terry & Tench Company; the Boston & Maine, for 120 tons at Holyoke, to the Boston Bridge Works. The New York Central is inquiring for 2500 tons in bridges and the Boston & Maine for about 100 tons. It is understood that the office building in Lexington, Ky., will require 2000 tons. The Loose-Wiles Biscuit Company is to build a 10-story factory in Long Island City. We quote plain material at 1.66c. to 1.86c., New York, for mill shipment, according to delivery, and 2.15c. from store.

Steel Plates.—Two conflicting conditions have presented themselves; one that a few buyers are not hastening to close for 1913, believing that the present price level is at least stationary for some time, and the other that Pittsburgh prices will shortly be $2 a ton higher for extended deliveries, that is, for shipments at the pleasure of the mill. Car buying has dropped off, as has also new inquiry in car lines, and there is a tendency to wait to ascertain more clearly if possible the activities and influence of the extra session of Congress

which is to be called in April. A side light on the situation is that the Delaware, Lackawanna & Western has closed on 2200 cars which it does not ask to have delivered before August of next year, and while it may be that car builders made concessions to get this future business on the books it would appear that the railroad felt justified in buying at this time. An offer to close on several hundred tons of plates and sheets to a copper company, with the delivery on the plates in five weeks at 1.60c., Pittsburgh, did not prove sufficiently attractive. The Atlantic Coast Line bought 300 flat cars from the Mount Vernon Car Mfg. Company and the distribution of the Lackawanna business was as follows: American Car & Foundry Company, 500 box, 250 hopper and 500 gondola; Standard Steel Car Company, 250 hopper and 200 refrigerator; Barney & Smith Company, 500 box. The American Car & Foundry Company is understood to have closed for 2000 refrigerator cars for the Southern Pacific. The Canadian Pacific is inquiring for 600 ballast cars. The Norfolk & Western's inquiries are likely to total 4250 cars. Plates for prompt shipment, say for two weeks, easily command warehouse prices, such as 2c., New York; sheared plates are 1.76c., and universal plates, 1.81c., New York, in eight to ten weeks, and 1.66 to 1.71c., New York, for future delivery.

Iron and Steel Bars.—Steel bars continue scarce, practically impossible to obtain for prompt shipment on new demand, and iron bars are strong. There are recurring evidences of bar iron being purchased because of the inability to procure steel. Rivets are up $2 a ton and spikes are stronger with a large export movement, particularly to Cuba. There is diminished new inquiry in steel bars and the lull is taken to be an indication of a waiting policy to ascertain something of the effect of impending national legislation. Steel bars remain nominally at 1.40c., Pittsburgh, or 1.56c., minimum New York, mill shipments, and from store, 2c. Refined iron bars are 1.70c. to 1.75c., New York, and from store, 2c.

Cast Iron Pipe.—The only public letting in sight in this immediate vicinity is that announced last week, on which bids will be opened by the Department of Water Supply, Gas and Electricity of the city of New York to-day for 2300 tons for the Borough of Richmond (Staten Island). This will be a contractor's job, and the contractor receiving the work will purchase the pipe privately. The trade has now settled into a quiet condition, which is usual this late in the season. The demand from private buyers, however, had been so excellent up to the week of the Presidential election that its abrupt termination causes some disposition to couple the two events. Practically nothing has been done the past week either for immediate shipment or for spring delivery. Carload lots of 6 in. are firm at $24 to $25, per net ton, tidewater.

Old Material.—The situation as to steel scrap appears to be worse than reported last week. Yards of consumers in eastern Pennsylvania are reported to be congested with scrap. The shipments to mills have latterly been unusually heavy, as the supply of material is exceptionally plentiful. One of the largest works in eastern Pennsylvania is now threatened with an embargo and has requested all deliveries stopped on contracts. Some demand for rolling mill stock is coming from bar iron mills, which are about to resume operations after a long shut down. Cast scrap is in good demand, as the foundries are becoming better employed and are more favorably inclined toward the use of scrap because of the advancing cost of pig iron. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	$12.25 to $12.75
Heavy melting steel scrap	12.25 to 12.75
Relaying rails	22.50 to 23.00
Rerolling rails	14.50 to 15.00
Iron car axles	24.00 to 25.00
Old steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.75 to 15.00
Wrought iron track scrap	13.25 to 13.75
No. 1 yard wrought, long	12.75 to 13.00
No. 1 yard wrought, short	12.25 to 12.75
Light iron	5.50 to 6.00
Cast borings	9.00 to 9.50
Wrought turnings	9.50 to 10.00
Wrought pipe	11.25 to 11.75
Old car wheels	15.00 to 16.00
No. 1 heavy cast, broken up	12.00 to 12.50
Stove plate	9.75 to 10.00
Locomotive grate bars	9.50 to 10.00
Malleable cast	11.50 to 12.00

Ferroalloys.—In a market that is not devoid of inquiry, but which nevertheless is considered quiet, quotations for spot ferromanganese range from $72.50 to $75, and even higher. For delivery in the first half of next year $62.50, Baltimore, is asked, and $61 for the last half. An inquiry is out for 300 tons and small lots make up about 200 tons additional, all for delivery in the first half, and one for about 500 tons for the last half. There is no abatement in the anxiety of consumers to obtain early deliveries on contracts. Ferrosilicon is unchanged as to prices, which are $75, Pittsburgh, for carloads; $74 for 100 tons and $73 for 600 tons or over. The United States Steel Corporation, it is understood, has not yet placed orders for the several thousand of tons it will require in 1913. Inquiries for ferrochrome are still before the trade.

Metal Market

NEW YORK, November 20, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Nov.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
14	17.75	17.55	50.30	4.65	4.50	7.45	7.30
15	17.75	17.62½	50.25	4.65	4.50	7.45	7.30
16	17.75	17.62½	....	4.65	4.50	7.45	7.30
18	17.75	17.62½	49.95	4.65	4.50	7.45	7.30
19	17.75	17.62½	49.70	4.65	4.50	7.50	7.35
20	17.75	17.62½	49.65	4.65	4.50	7.50	7.35

With nearly all resale lots eliminated copper producers are reported as making both foreign and domestic sales at full prices. Tin is quiet at lower prices. Lead is weak and lower. Prompt delivery spelter is firmer. Antimony is unchanged.

New York

Copper.—Reports which are generally prevalent and usually accepted indicate that buying of copper has been resumed by European consumers though no remarkably heavy tonnages are involved. It is further stated that domestic buyers have bought to a considerable extent in the last week or ten days and that all buyers have paid full prices on the basis of 17.75c., New York, cash, for Lake and 17.62½c., cash, 30 days, New York, for electrolytic and the sellers have been almost without exception the producing interest inasmuch as little copper is left in second hands. This situation would explain the quietness now existing in what may be termed the outside market. Very little demand is heard for Lake and its price. The exports for this month total only 8657 tons, which is the lowest figure for a corresponding period in several years. The small exports are variously construed, some saying that they merely indicate that deliveries on contracts are nearing fulfillment, while others assert that not as much copper was sold abroad as has been supposed. It is felt that Europe must come into the market strongly by the end of this month. If it does not and production here goes ahead at its recent rate stocks are bound to show an abnormal addition to surplus. The price of copper in London this morning was £78 1s. 3d. for spot and £78 15s. for futures.

Pig Tin.—The market has been quiet since Monday, after which day the activity has been almost exclusively the taking of quick delivery small lots, a kind of trading which goes on rather steadily at all times and usually attracts but little attention. In the latter part of last week sales of tin increased materially and between 700 and 800 tons were dealt in, which was an improvement over several weeks past. Since Monday, however, the interest in futures appears to have fallen off, although prices have declined in a way that would seem to invite buying. There is an abundance of the metal, arrivals this month having been 2426 tons, although it is understood of course that much of this was previously contracted for, and there is afloat 1445. Tin is quoted in London to-day at £227 for spot and £227 5s. for futures. The New York price is 49.65c. Consumption continues at full ebb.

Tin Plates.—The situation is without change so far as prices are concerned, and the demand continues to slacken in keeping with the quiet that usually prevails in the last two months of the year.

Lead.—This metal is decidedly easy and the general opinion is that it is only a matter of days when there will be a further decline in prices, which are now 4.65c. New York, and 4.50c. St. Louis, although the American Smelting & Refining Company still quotes 4.75c. Not only are there numerous offerings below the quoted price of the largest producing interest, but the season approaching is a dull one for lead.

Spelter.—The market is quiet, although for prompt delivery metal prices stiffened about five points yesterday. Future positions are unchanged. Previous to yesterday there was a sagging tendency all along the

line, largely because of the inactivity of new demand, the mills having booked orders covering most of the requirements to the end of the year. The price in New York is 7.50c. and in St. Louis 7.35c.

Antimony.—The market is dull at unchanged prices as follows: 10.37½c. for Cookson's, 9.75c. for Hallett's and 9.37½c. for Hungarian and Chinese grades.

Old Metals.—The market is strong. Dealers' selling prices have advanced and are now as follows:

	Cents per lb.
Copper, heavy and crucible	17.00 to 17.25
Copper, heavy and wire	16.50 to 16.75
Copper, light and bottoms	15.00 to 15.25
Brass, heavy	10.50 to 10.75
Brass, light	8.50 to 8.75
Heavy machine composition	14.00 to 14.25
Clean brass turnings	9.75 to 10.00
Composition turnings	12.50 to 13.00
Lead, heavy	4.75
Lead, tea	4.50
Zinc, scrap	6.25

Chicago

NOVEMBER 19.—There has been some wavering in the market position of spelter, and slight concessions from the maximum prices are noted. Copper, lead, and tin quotations are continued. We quote as follows: Casting copper, 17.75c.; Lake, 17.87½c. to 18c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 50.75c.; small lots, 53c.; lead, desilverized, 4.75c. for 50-ton-lots; corroding, 5c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.40c. to 7.50c.; Cookson's antimony, 11.25c., and other grades, 10.50c. in small lots; sheet zinc is $9, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 15.50c.; copper bottoms, 14c.; copper clips, 15c.; red brass, 12.75c.; yellow brass, 10c.; lead pipe, 4.25c.; zinc, 5.50c.; pewter, No. 1, 33c.; tinfoil, 39c.; block tin pipe, 45c.

St. Louis

NOVEMBER 18.—Business has continued good. Lead has fallen off a little to 4.50c. Spelter is steady at 7.30c. Lake copper has been quiet at 17.97½c. to 18.22½c. and electrolytic at 17.87½c. to 18.12½c. Tin is quotable at 50.05c. to 50.55c. Cookson's antimony stands at 10.87½c. In the Joplin ore market there was some drop in the top price, but there was a stronger feeling and a higher price for the basis grades, with the result that the total value of the week's shipments ran to $502,470, the largest in the history of the district. The top price for zinc blende was $60 per ton, with the range for 60 per cent. metallic ore $54 to $57, a gain of $2 to $4 per ton. Calamine sold for $28 to $32 for 40 per cent., with the top figure for the choicest lots reaching $38. Lead ore fell off $1 per ton and was quoted at $57 for 80 per cent., a loss of $10 from the high price of a few weeks ago, due to the recession in the pig lead market. In consequence the production of lead ore has decreased. We quote miscellaneous scrap metals as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; pewter, 25c.; tinfoil, 32c.; zinc, 4.50c.; lead, 4c.; tea lead, 3c.

The National Founders' Meeting

The influence of impending national legislation in respect to the tariff but particularly in regard to labor promises to be the topic of most interest at the sixteenth annual convention of the National Founders' Association at the Hotel Astor, New York City, November 20 and 21. As usual the general lines along which the subject may best be discussed were considered at length at the so-called "Alumni" dinner held Tuesday night, but there are a number of papers scheduled which will not be reached until after this issue goes to press. There were 35 present at the alumni dinner. A pleasing departure was made this year in the association meeting by providing a buffet luncheon immediately after the Wednesday morning session. It gave ample opportunity for extension of acquaintances and the exchanging of experiences and views, so important a feature of an association gathering. The need of the luncheon arrangement was regarded as all the greater because of the large increase in membership in the last two years, 52 this year and 61 last year, with a net gain of over 100.

The National Commercial Gas Association will hold its eighth annual convention at the Armory, Atlanta, Ga., December 2 to 7.

Iron and Industrial Stocks

NEW YORK, November 20, 1912.

The stock market has been somewhat inclined to weakness. This is partly ascribed to the influence of unsettled European conditions and partly to the shadow cast by the announcement that an extra session of Congress will be called, probably in April, to revise the tariff. Security values, even on the weakest days, have not shown much recession, so that the market may be said to have considerable underlying strength. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Bald. Loco., com.	56 - 57¼	Railway Spring, com.	36½ - 37¾
Bald. Loco., pref.	106¾-107	Railway Spring, pref.	101
Beth. Steel, com.	39½ - 43⅛	Republic, com.	27⅜ - 32¼
Beth. Steel, pref.	68½ - 73	Republic, pref.	90 - 92
Can, com.	39½ - 42¼	Sloss, com.	50 - 54
Can, pref.	122 -122⅞	Sloss, pref.	95¼
Car & Foundry, com.	59½ - 60¾	Pipe, com.	18¾ - 19⅝
Car & Foundry, pref.	118½-119¾	Pipe, pref.	60½ - 60¾
Steel Foundries	40 - 41⅛	U. S. Steel, com.	73⅛ - 76
Colorado Fuel	36 - 37¼	U. S. Steel, pref.	111¾-113
General Electric	181 -182	Westinghouse Elec.	80½ - 82¼
Gr. N. Ore. Cert.	45¾ - 46½	Am. Ship, com.	54 - 56
Int. Harv., com.	120 -121	Am. Ship, pref.	105
Int. Harv., pref.	118	Chic. Pneu. Tool	53¾ - 54½
Int. Pump, com.	23 - 26½	Cambria Steel	49¼ - 50½
Int. Pump, pref.	78¾ - 79¾	Lake Sup. Corp.	30⅛ - 31½
Lackawanna Steel	48 - 50	Pa. Steel, pref.	95 - 96
Locomotive, com.	45½ - 47⅜	Warwick	10½
Locomotive, pref.	106¼-107	Crucible Steel, com.	16¾ - 17½
Nat. En. & St., com.	20½ - 21	Crucible Steel, pref.	96 - 96¾
Pressed Steel, com.	37 - 38	Harb. Walk Ref., pref.	102
Pressed Steel, pref.	101¼-101⅝		

The American Brake Shoe & Foundry Company is offering stockholders the right to subscribe to 10,000 shares of new preferred stock and 10,000 shares of common at $215 for a unit consisting of one share of each class. The ratio of subscription is only 26 per cent. of the present holdings. With the proceeds of the sale the company will buy four foundries in the South.

Dividends Declared

The Underwood Typewriter Company, regular quarterly, 1 per cent. on the common stock and 1¾ per cent. on the preferred, payable January 1.

The Harbison-Walker Refractories Company, regular quarterly, ½ of 1 per cent. on the common stock, payable December 1.

The Steel Corporation Dissolution Suit

WASHINGTON, D. C., November 19.—The taking of testimony here in the suit of the Government for the dissolution of the United States Steel Corporation was interrupted to-day by the action of the attorneys representing the corporation taking the position that the testimony of Francis Walker, assistant commissioner of corporations of the Department of Commerce and Labor, was "argumentative" and not entitled to admission. Failing to keep from the record Mr. Walker's deductions from tables which he furnished from the files of the Bureau of Corporations covering prices and production of iron and steel since 1895, those attorneys secured from J. A. Brown, the special examiner, a postponement until the testimony could be presented to the United States Circuit Court at Philadelphia with a motion that it be stricken from the record on the ground that it was argumentative, hearsay, etc.

Hearings in this case will probably be resumed here after the court's action on the motion to strike out a large proportion of Mr. Walker's testimony. W. L. C.

Detinning Patent Judgment.—At Trenton, N. J., November 18, the Court of Errors and Appeals affirmed the decision of a lower court and of a special master, awarding the Vulcan Detinning Company the profits the American Can Company made in 1903-1907 by appropriating the complainant's patent process for recovering tin from scrap tin. The net amount to be realized under the judgment is about $613,000, the award with interest being $827,352, while $214,287 was allowed the American Can Company for the value of its detinning plants closed by the Vulcan company's injunction. It is stated that the American Can Company has for some years carried a special reserve to meet this judgment.

Marshall furnace, of the Juniata Furnace & Foundry Company, Newport, Pa., which has been idle for several years, will be blown in about December 1.

Personal

At Johnstown, Pa., on the evening of December 5, a testimonial reception and dinner will be tendered William H. Donner, president Cambria Steel Company; Daniel Coolidge, president Lorain Steel Company, and James A. Farrell, president United States Steel Corporation. J. L. Replogle, vice-president and general manager of sales of the Cambria Steel Company, and a number of leading Johnstown business men comprise the committee in charge.

Thomas Hunter, for some years foreman of the machine shops of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has resigned to accept a similar position with the Illinois Steel Company at South Chicago.

Wilber A. Carrell, formerly chief engineer of the H. J. Heinz Company at Pittsburgh, and prior to that connected with the Mesta Machine Company and the Westinghouse interests, is now associated with Edgar M. Moore & Co., dealers in iron and steel products, Farmers' Bank Building, Pittsburgh, in charge of a new department to deal in second-hand steam and electrical machinery.

David White has been promoted to the position of chief geologist of the United States Geological Survey to succeed Waldemar Lindgren, who becomes Rogers professor of geology and head of the geological department of the Massachusetts Institute of Technology, Boston, but also retains his position as one of the geologists of the survey. Dr. F. L. Ransome succeeds Mr. Lindgren as chief of the section of economic geology of metalliferous deposits.

Joseph Wolf, formerly of the Hisey-Wolf Machine Company, Cincinnati, has become interested in and is now vice-president and general manager of the Cincinnati Electrical Tool Company, maker of portable electrical drills and grinders. He will take entire charge of the management of the business, and will surround himself with competent heads in the different departments. The company will bring out several new and improved tools in the near future.

Charles W. Beaver who is in charge of the London and Paris offices of the Yale & Towne Mfg. Company, arrived in New York November 16 for a stay of about one month.

President L. R. Lemoine of the United States Cast Iron Pipe & Foundry Company, New York, has returned from Europe.

Walter Rachals, who has resigned from the office of Julian Kennedy to go with Westinghouse, Church, Kerr & Co., will be succeeded by W. C. Rott, lately resident engineer for Mr. Kennedy at the new plant of the Brier Hill Steel Company, Youngstown, Ohio.

C. E. Knoeppel, 761 West Delavan avenue, Buffalo, N. Y., announces the establishment of a professional consulting service in constructive organization and management after an experience as workman, draftsman, office manager, systematizer and efficiency engineer in a number of industrial plants manufacturing widely varying lines.

O. B. Osborn, vice-president Berlin Machine Works, Beloit, Wis., has gone abroad for his health. He will visit China, Japan and the Philippine Islands.

J. H. Hazley has been appointed Eastern traveling representative of the Wilmarth & Morman Company, Grand Rapids, Mich., manufacturer of grinding machinery.

W. H. E. Royce, formerly superintendent of the coke works of the Republic Iron & Steel Company near Uniontown, Pa., has been made general manager of the Connellsville Basin Coke Company, which has 200 coke ovens at Rock Forge, W. Va.

Arthur W. Prausnitz, associate Pacific coast manager for the Orenstein-Arthur Koppel Company, is on his way to Europe to make arrangements for enlarging the company's business on the coast.

H. M. Garlick, treasurer Youngstown Sheet & Tube Company, addressed the Y. M. C. A. at Youngstown, Ohio, November 21, on "Credits and Credit System."

John Calder, Cadillac Motor Car Company, Detroit, Mich., is to deliver a series of lectures beginning January 9 before the senior class of the Stevens Institute of Technology at Hoboken, N. J., on "Shop Management," covering organization, system, foremen and workmen, industrial hygiene, the modern plant and the engineer's social relations.

Henry Hess has resigned as president of the Hess-Bright Mfg. Company, Front street and Erie avenue, Philadelphia, Pa. It is understood that no change in the policies of the company is contemplated.

Walter B. Snow, publicity engineer, 170 Summer street, Boston, has added to his staff Fred R. Lufkin, formerly of the instructing staff in electrical engineering of the Massachusetts Institute of Technology, and late assistant superintendent of lighting and wires of Brookline, Mass.

President J. A. Farrell and Controller W. J. Filbert of the United States Steel Corporation, and Eugene P. Thomas, president of the United States Steel Products Company, returned this week from a tour of the Pocahontas coke plants of the Steel Corporation. Over 400 ovens, long inactive, have recently been started up in this field.

Obituary

WILLIAM N. HOBART, president Triumph Electric & Ice Machine Company, Cincinnati, Ohio, died at his home in that city, after a lingering illness, November 14, aged 76 years. He was born in Boston and at the age of two years was taken to Cincinnati by his father, the late James T. Hobart, who was largely interested in the coal mining industry in the Central West. The son was for several years a prominent distiller, but later devoted all his time to building up the business of the company of which he was president at the time of his death. He was a well-known patron of art and music, and for more than 10 years was president of the Cincinnati May Musical Festival Association. His musical leaning also brought him into close touch with the business end of the art, and for several years he was a large stockholder and a director of the John Church Company. In his active career he had served as president of the Cincinnati Chamber of Commerce and of other business associations. He leaves two sons, one of whom, James C. Hobart, is active head of the Triumph Company, and two daughters.

BENJAMIN TAYLOR LONGSTRETH died at Atlantic City, N. J., and not at his Rosemont home, as stated in *The Iron Age* last week. He had been connected with the firm of Morris, Wheeler & Co. for 45 years, and for more than 20 years had been a partner. He traveled extensively for the firm for a period of over 40 years, and few in the iron and steel trade were as well and favorably known as he throughout the entire South and in the various parts of Pennsylvania in which he traveled. He was the son of the late William C. Longstreth, secretary and treasurer of the Williamsport & Elmira Railroad Company and vice-president of the Provident Life & Trust Company, Philadelphia. He was also a nephew of Mrs. Israel Morris, wife of the founder of the firm of Morris, Wheeler & Co. He leaves a widow and four sons, two of whom are of age and in business. He was a member of the Society of Friends, and served for many years on the School Board of Philadelphia.

ADRIAN VANDERKLOOT, president South Halsted Street Iron Works, and one of the most prominent among Chicago fabricators of structural steel, died suddenly last week at the home of his brother from heart disease, aged 62 years. He was born in the Netherlands and had resided in Chicago 45 years. He leaves a widow and two sons.

HENRY L. WADE, president of the Mattatuck Mfg. Company, brass goods, Waterbury, Conn., since its organization, died October 31.

The Lebanon Valley Iron & Steel Company, Lebanon, Pa., has purchased the Boughton Bolt Works at Elyria, Ohio, and is planning for its immediate removal to a portion of the extension to the company's Hebron plant, now in course of erection at Lebanon. The additional equipment will give the Lebanon plant 60 more bolt making machines, with a capacity of 250,000 bolts per day.

Industrial Welfare Work Discussed

Corporation Heads Indorse Y. M. C. A. Methods—Instruction in English

Men of prominence in the iron and steel and manufacturing industries were guests at a luncheon held November 14 at the Railroad Club, New York, in connection with the Industrial Welfare Conference conducted under the auspices of the Industrial Department of the International Committee of the Young Men's Christian Association. Of the 70 who attended, the majority were business men and the others secretaries who are devoting themselves to welfare work in the mill, manufacturing and mining districts. John Sherman Hoyt, treasurer Standard Plunger Elevator Company and vice-chairman of the Industrial Department, presided at the luncheon and introduced several secretaries, who told of their work, of the needs of the industrial field and of the co-operation desired by employers and employees.

Among the speakers were Dr. Peter Roberts, who explained how foreigners are cared for on arrival in this country and enabled to get a working knowledge of the English language; R. P. Kaighn, who described the work carried on in shops and factories; Fred H. Rindge, Jr., who told of enlisting engineering students in service that brings about personal contact with workingmen and fits them to handle men better when they become engineers; Ira D. Shaw, Pittsburgh, who told of good accomplished in mining regions, and Charles R. Towson, senior secretary, who has general supervision of the Industrial Department. Mr. Towson confined his remarks to three points as follows: 1. The modern industrial type of Y. M. C. A. work pays from the economic viewpoint. 2. That an increasing number of employers recognize its value and are supporting it. 3. That employees of all creeds and nationalities welcome and use it, and thus far not a single failure has been made.

The addresses of the secretaries were followed by brief remarks by H. H. Westinghouse, vice-president Westinghouse Air Brake Company; W. B. Schiller, president National Tube Company, and S. J. Watson of the Lynn, Mass., plant of the General Electric Company, all of whom strongly indorsed the work of the Industrial Department. Mr. Westinghouse said that when his company moved its works to Wilmerding, Pa., a few years ago, the transfer of the plant itself was simple as compared with the problem of creating at once a proper civic environment for 2000 employees, and in this emergency the aid of the Y. M. C. A. was enlisted. The town has grown greatly and nothing has given his company more satisfaction than the excellent character of the community, which he credited largely to the association, saying that his company had done nothing more than stimulate the cause. "We have been recompensed beyond computation," he concluded.

At the conference the announcement was made that the Westinghouse Air Brake Company will shortly erect a special building for the use of its foreign employees on land which has just been purchased for the purpose. The welfare activities of the company have included recreation grounds convenient to both the English and foreign-speaking people, instruction in English, health talks, travelogues, bathing facilities, etc. Mr. Schiller, whose company supports Y. M. C. A. work at Lorain, Ohio, and at McKeesport, Pa., spoke of the recently established work of teaching the English language to foreign employees at Wheeling, W. Va. He acknowledged that at first he was apprehensive because of the religious feature of the work, but the results had proved very satisfactory and tended to a great degree to solve the serious question of accidents, many of which are caused by failure of the workmen to understand the orders of their foremen. Mr. Watson of the General Electric Company also dwelt upon the dangers of misunderstandings under similar circumstances, especially in hazardous employments, and told of the betterment that had followed the teaching of English to the foreign-born employees of the plant with which he is connected.

In the afternoon a conference of secretaries which had begun in the morning was continued, and several of the guests remained to hear views on the workingmen's needs as expressed by a blacksmith, a machinist and a workman of Russian birth. It was noticeable that the first two did not agree, the blacksmith holding to the opinion that the association could do much in a material way for workingmen, while the machinist said they could take care of themselves. The Russian told of impositions practiced upon non-English-speaking workmen, and urged that the language classes be extended.

The trend of all the discussions was that the Y. M. C. A. is seeking to render practical service to industry that will increase the efficiency of employees and justify investment by employers in this type of welfare work. It was noticeable in all the discussions that emphasis was placed upon mutuality and that paternalism was eliminated from the plan.

The Panama Canal Finished in 1913

The Panama Canal will practically be completed by July 1, 1913, according to the annual report, just issued, of Col. George W. Goethals, the chief engineer. By August 1, 1913, he says, the spillway at Gatun dam will be finished. Several slides in Culebra cut and the delays in the delivery of material and machinery for the gates of the canal locks have retarded construction, but the handicap imposed has only made the canal employees more eager than ever to win the fight on scheduled time. Sensational importance not warranted by the facts has been given to the slides in the Culebra cut in the last year. None of those which have occurred so far would have stopped the passage of ships through the canal, he says, had the canal been in operation at the time.

President Taft on November 13 issued a proclamation fixing the rates of toll on vessels passing through the canal. With the proclamation was made public a report by Prof. Emery R. Johnson of the University of Pennsylvania, the Government's Panama transportation expert, showing the probable development of traffic through the canal. Professor Johnson figures that under the system of tolls promulgated by the President the canal will be self-supporting in the first decade and that in the second and succeeding decades the revenue ought to be sufficient to permit of the ultimate amortization of the entire $375,000,000 investment in the canal.

The tolls fixed by the President are practically those charged by the Suez Canal, with which the American waterway will compete for a part of the world's shipping. The Panama Canal, however, will not impose any toll on passengers, while the Suez charges 10 francs for each passenger. The tolls are as follows:

On merchant vessels, carrying passengers or cargo, $1.20 per net vessel ton—each 100 cu. ft.—of actual earning capacity.

On vessels in ballast, without passengers or cargo, 40 per cent. less than the rate of tolls for vessels with passengers or cargo.

On naval vessels, other than transports, colliers, hospital ships and suppy ships, 50 cents per displacement ton.

On army and navy transports, colliers, hospital ships or supply ships, $1.20 per net ton, the vessels to be measured by the same rules as are employed in determining the net tonnage of merchant vessels.

The Secretary of War will prepare and prescribe such rules for the measurement of vessels and such regulations as may be necessary and proper to carry the proclamation into full force and effect.

The largest wholesale steel house in the South is to be established at Galveston, Texas, by Markle Brothers, composed of C. N. Markle, formerly of St. Louis, and F. B. Markle, of Palestine, Texas. The senior partner was formerly with the Simmons Hardware Company, in charge of one of the large departments, but more recently has been president of the Markle Lead Works. The junior partner has represented the Simmons Hardware Company in Texas for the past 25 years. Both are well acquainted with the trade in the Southwest. It is reported that their first orders for round and flat steel as well as twisted squares aggregate more than 100 car loads, in addition to which they will carry a large stock of structural steel.

The United States Steel Corporation on September 30 had nearly $72,000,000 cash under "current assets" and $8,312,000 cash under " insurance and depreciation funds," or a total of over $80,000,000. The largest cash holding previously reported was on December 31, 1906, when the amount was $67,636,000.

Southern Iron Freight Rate Hearing

New England Consumers Desire Lower Rates

WASHINGTON, D. C., November 19.—The Interstate Commerce Commission concluded last Saturday the hearing of testimony in the case of the Sloss-Sheffield Steel & Iron Company and others against the Louisville & Nashville Railroad and others, this being the complaint against the freight rates on Southern pig iron from the Birmingham district to points north and northeast.

Counsel on both sides reached an agreement whereby the briefs of the complainants should be filed with the commission by January 1, and those of defendants by February 1. The commission also granted permission to attorneys representing the New York, New Haven & Hartford Railroad to take depositions concerning the physical valuation of that road. The attorneys on behalf of this road desire to have this information before the commission in connection with statements made by witnesses and complainants as to the amount of freight rate charged by that road for its proportion of haul of pig iron in New England. The evidence seemed to show that the New Haven road, or its subsidiary, the Boston & Maine, received an excessive proportion of the through haul.

It is believed that the final argument in the case will be made before the full commission some time in February, and it is the expectation that the decision will be handed down by May 1. It appeared to be the general opinion among the witnesses examined during the week that the present adjustment of freight rates on pig iron from the Southern field to Ohio River crossings and from there to points of consumption in the North and Northeast resulted in the loss by Southern furnaces of at least 50 per cent.; that is, that if the approximate $1 to $1.42 per ton reduction asked was granted, the consumption of Southern pig iron would be increased to the extent of at least 50 per cent.

George B. Hamblin, purchasing agent for the Whitin Machine Works, Whitinsville, Mass., builder of machinery for cotton mills, was one of the chief witnesses of the week. He said that his company employs about 2600 people and the market for its product was in New England, New York, Pennsylvania and the South. He testified at length as to the composition of the Southern product and why it was advantageous to use it. He said:

> We are users of Southern pig iron, and we consider it a material factor in our business, and for that reason this question of the freight rate on Southern pig iron is of importance to me as a buyer. I am here also as one of the intervening petitioners from New England, and I would say that I believe there are 54 different concerns represented in our petition. I am also here as a member of a committee appointed by the New England Foundrymen's Association, and our association's membership comprises 130 different business firms, most of whom are melters of pig iron.
>
> We use pig iron in our foundry to the extent of from 12,000 to 18,000 tons a year, depending on business conditions. In looking over our books, I find that, including 1907, up to the present time, we have purchased 89,000 tons of pig iron. Of that amount, 57,000 tons was Northern iron, 27,000 was Southern, and 5000 tons was iron we imported from England. We purchase from the South in particular because we have difficulty in obtaining ore that runs high in phosphorus.

"Why do not you use more Southern iron, a greater proportion of Southern iron?" asked William A. Wimbish, chief attorney representing the complainants. Mr. Hamblin replied:

> We do not use more Southern iron for the simple reason that the price is too high. Our method of purchasing iron is to buy it in lots of 2000 to 5000 tons of a single brand, and our experience is that, particularly when the market is quiet, we can obtain from some Northern producer of pig iron a price which is more or less of a concession from the prices that are being named to smaller consumers, and those prices average regularly from 50c. to $1 per ton lower than the prices for Southern iron.

Mr. Hamblin referred at length to the readjusted and increased freight rates on pig iron from the Southern district since 1907, and he gave a series of statistics showing the readjustments of the rate that had taken place since that year. He said that the effect of a reduction of $1 per ton on pig iron from Birmingham, as prayed for in this case, would enable his works to use at least 50 per cent in the mixture, which at present they did not feel they could afford to do, and as compared with what they used now it would mean a material saving in their foundry account. Mr. Hamblin added that the reduction asked for would simply enable Southern iron to compete at equal prices, or about equal prices, with the Northern iron, or probably something higher still.

In the course of his testimony Mr. Hamblin said that now it appeared his works would have to make further advances in wages, and that at the present time it was threatened, as it had not been threatened for a good many years, with foreign competition, owing to the proposed tariff modifications, which would materially reduce their prices and would necessitate a reduction in their costs.

Bartlett M. Shaw, superintendent of the Walker & Pratt Mfg. Company, Watertown, Mass., manufacturer of stoves, expressed the opinion that the rate asked for would permit his company to use 50 per cent. of Southern pig iron, whereas at the present time, on account of the present rate, they were using but 25 per cent. He said that it would be in the interest of the public to have Southern and Northern iron meet in competition. Mr. Shaw placed on the record a series of figures tending to show that the Boston & Maine Railroad secured an excessive proportion of the freight rate on its haul of pig iron in New England.

Henry A. Carpenter, connected with the General Fire Extinguisher Company, Providence, R. I., said that his company used Southern iron because its chemists think they get a better mixture by using a certain proportion of Southern with Northern. He filed in the record figures showing the rate from the Birmingham district to the plants of his company.

John Sargeant, Cincinnati, representing the Domhoff-Joyce Company, seller of pig iron and coke, detailed at length the changes and increases on pig iron from the Southern district, and said that Southern iron is suited to mix with Northern iron and vice versa, one giving the necessary strength and the other the necessary fluidity, and in conclusion he said:

> We are selling a great deal of Southern pig iron even as far up as Cleveland. On price conditions there is no reason in the world why we should sell that iron, but they have had a certain percentage of it for a long time and are thoroughly familiar and satisfied that it is going to keep them out of trouble, and they will pay the difference in the price, and if you want to get the best of their mixture, the big volume, then you must necessarily have the competing conditions which meet this price.

On re-direct examination, Mr. Sargeant said that when the freight rates on Alabama pig iron have been advanced, no matter whether it was 25 or 50 or 75 c. or $1, it was found to tend to decrease the sale in any given territory, unless the furnaces were able to equalize that in shrinking their prices at the furnace.

David Evans, Chicago representative of the Sloss-Sheffield Company, and also a representative of the Chicago Foundrymen's Association, outlined the changes in rates from the Southern field, and of the deleterious effect of the increased rate on the amount of production, and he cited the names of Southern furnaces that had been shut down on account of the excessive rate.

H. S. Chamberlain, Chattanooga, president Roane Iron Company and Citico Furnace Company, in the course of his testimony said that the Roane Company was being "wrecked" as the result of the present freight rates.

James A. Green, Cincinnati, of the firm of Matthew, Addy & Co.; Bayard T. Bacon, Chicago, representing several Northern furnaces; Charles A. Stillman, Chicago, of the Iroquois Iron Company; J. H. Frantz, Columbus, vice-president Columbus Iron & Steel Company; J. S. Stillman, Catasaqua, Pa., secretary and treasurer Empire Steel & Iron Company, also testified as interveners either against or for the present rate on pig iron from the South. The Northern manufacturers of pig iron showed that a number of furnaces in the North are out of blast, indicating that freight rates are not wholly responsible for iron trade conditions.

C. B. Compton, freight traffic manager of the Louisville & Nashville Railroad, and traffic officials of other railroads, defendants in the proceedings, placed in the record numerous exhibits showing rates, tonnage, etc., of pig iron from both Northern and Southern points of production to destinations. The railroad attorneys, outside of cross-examining the witnesses, contented themselves with placing in the record the testimony of the carrier's officials.

W. L. C.

Royal Commissions Sought in Canada

TORONTO, November 16, 1912—In the session of Parliament that opens November 21 the government's bill to constitute a Tariff Board will again be introduced. Possibly after again passing the House it may once more be defeated in the Senate by the Liberal majority there. However that may be, there seems little likelihood that the tariff will be generally overhauled by Parliament until after investigation by such a board as the government proposes to establish by act of Parliament. Before the general elections of last year, Mr. Borden, now Prime Minister, but then leader of the opposition, declared that tariff revision would not be proceeded with until the government was placed in possession of information gathered and reported by a board of impartial and competent commissioners.

The interests most impatient for tariff changes are those connected with the steel industry, and these call for an upward, not a downward, revision. They presented their case to the government some three weeks ago, and it is understood that the memorial then submitted has been followed by another statement on their part calling for the reference of the question as to the need of protection in the steel industry to a special board of experts appointed under royal commission. This would be satisfactory to the steel men for the two reasons that it would enable the inquiry to proceed at once instead of being left contingent upon the passing of a bill through Parliament; and it would elicit the really genuine facts. A royal commission is issued by the Governor-in-Council, and the men serving under it are appointed by the same authority. Parliament has nothing to do with it. If the tariff bill is again rejected by the Senate, another year would pass without any board being set to work under it to collect data for revision. That would be considered by the steel companies as an undue prolonging of their disadvantages in competition with foreign rivals in the home market. Doubtless a board of commissioners, men of expert knowledge concerning the steel industry, could cover the subject in a few weeks and have its report in the hands of the government in time for legislation to follow in the present session of Parliament, if the government should feel warranted in bringing forward such tariff legislation in behalf of the steel industry.

Last Saturday Premier Borden received a deputation representing the Trades and Labor Congress of Canada. Among the things asked for was a royal commission for the purpose of investigating the conditions of the steel workers in Nova Scotia. They said that the hours of labor were too long, and that the wages were too low, and that the officers and organizers of the union were subject to harsh treatment by the private police in the service of the steel interests. The Premier promised consideration.

C. A. C. J.

Colorado Fuel & Iron Company's Production

The Colorado Fuel & Iron Company's report for the year ended June 30, 1912, of which an abstract was given in *The Iron Age* of October 3, page 819, gives its production as follows, in net tons:

	1912	1911	1910
Coal	4,038,852	4,233,756	4,722,832
Coke	777,993	753,192	905,599
Iron ore	813,728	841,699	879,630
Limestone	459,913	425,704	407,517
Finished iron and steel	485,743	424,421	412,749

President J. F. Welborn says that the year's steel output fairly represents the capacity of the plant, limited as it is by the capacity of the open-hearth department of 12 furnaces, and if the increased demand for all kinds of steel products proves to be fairly permanent, authority will be asked to construct six additional open-hearth furnaces.

The Foremen and Superintendents' Club of Oakley, Cincinnati, Ohio, held an enthusiastic meeting in the auditorium of the Cincinnati Milling Machine Company on the evening of November 13. Edward G. Fischer, demonstrator, assisted by Theodore Seigfried, operator for the Follansbee Brothers Company, Pittsburgh, gave an illustrated lecture on the manufacture of sheets and roofing tin, followed by a moving picture exhibit showing the different departments of the Cincinnati Milling Machine Company's plant while in active operation.

Ore Freight Rates to Pittsburgh

WASHINGTON, D. C., November 19.—The final hearing of the testimony in the Pittsburgh ore case, involving the freight rate from Ashtabula Harbor to the Pittsburgh district, was heard before the Interstate Commission yesterday, the testimony being on behalf of the railroads. Joseph Wood, vice-president Pennsylvania Railroad, and D. T. McCabe, fourth vice-president Pennsylvania Lines West of Pittsburgh, being the principal witnesses. The complaint is that the carriers discriminate against the Pittsburgh district because lower rates are given to all the other districts, especially Columbus and Wheeling. The rate to the Pittsburgh district is 96c. a ton, as against 50c. to Columbus for about the same distance, and 60c. to Wheeling for the same or a greater distance.

The complaint was brought by the Pittsburgh Steel Company, in its own behalf and in behalf of all other consumers of iron ore similarly situated in the Pittsburgh district, against the Lake Shore & Michigan Southern, the Pittsburgh & Lake Erie, the Pennsylvania Company and the Pennsylvania Railroad Company. The complaint charges that the rates from Ashtabula Harbor to the Pittsburgh district were established and are now maintained by mutual agreement and combination of the defendant carriers named; that the combination agreement was made and is maintained in violation of law, and that by virtue of the excessive and unreasonable rates, the Pittsburgh Steel Company and all other consumers of iron ore similarly situated in the Pittsburgh district are subjected to an undue prejudice and disadvantage.

Mr. Wood and Mr. McCabe to-day both strenuously denied that the United States Steel Corporation had anything to do with the fixing of the rates on iron ore as the complainants have charged in testimony previously taken. Mr. Wood also claimed that the Bessemer & Lake Erie, which is owned by the United States Steel Corporation, did not participate in the conference in which the ore rates were fixed, and that the fixing of the rates by the other railroads was not for the purpose of favoring the Steel Corporation. On cross-examination, it was brought out that Mr. Wood had attended only a few of the conferences in which the ore rates were fixed, and that he did not know exactly how they were fixed. Traffic officials of the roads named as defendants testified as to tonnage and distances.

At a brief session held to-day, Wade H. Ellis and Challon B. Ellis, attorneys for the complainants, were given until January 1 to file their brief and the railroad attorneys were given until February 1 to file their briefs. The reply brief of the complainants is to be filed by February 15. A date for argument will be fixed then, and it is the general expectation that the commission will hand down its decision before the ensuing navigation season on the lakes.

W. L. C.

Car Shortage Culminating.—The American Railway Association figures show that on November 7 the net shortage of freight cars on the railroads of the United States and Canada was 51,259. The increase, being but 1278 cars from the total shown in the report of two weeks previous, is taken to indicate that the maximum shortage of equipment has about been reached. This has generally occurred in the last week of October, but the crop movement set in a little later than usual this year, while the tide of general business has been steadily rising. In the first week of November last year there was a net car surplus of 26,514. Two years ago it was 34,581.

Some trouble is being experienced in drafting regulations for the free admission of shipbuilding material, machinery and equipment under the clause in the Panama Canal act, passed last summer. The Secretary of the Treasury had drawn up and was about to announce regulations admitting free of duty practically everything connected with a vessel, but President Taft appears to be opposed to such a sweeping interpretation. The shipbuilding companies usually build their own machinery and they are vigorously protesting against regulations which include engines and other machinery as a whole. The regulations have not yet been issued and it may be some time until a decision is reached as to what they should cover.

Pittsburgh and Vicinity Business Notes

The Page Woven Wire Fence Company, Monessen, Pa., maker of rods, wire and wire nails, will start up this week its second 70-ton basic open-hearth furnace, which will bring the steel output to about 6000 tons of ingots per month. As not all this steel will be needed by the company in its rod and wire mills, a portion will be sold in the open market in the form of ingots. It is probable that the company will add a billet mill in the near future for the purpose of marketing its surplus steel in the form of billets.

At the annual meeting of stockholders of the Crucible Steel Company of America, held in Jersey City, N. J., last week, all the directors were re-elected with the exception of O. H. Wharton, who was succeeded by G. W. Sargent.

Henry F. Gilg, Bakewell Building, Pittsburgh, is representative in that city for the Wilkes Rolling Mill Company, Sharon, Pa., manufacturer of muck bar, puddled iron sheets and iron tin and terne plate. He also represents the Interstate Steel & Iron Company, Chicago, manufacturer of hard steel bars for reinforcing purposes and other specialties.

In October the Cambria Steel Company, Johnstown, Pa., broke all its records for one month in output and shipments. Ten new individual records were made in different departments.

An encouraging feature of the business of the Crucible Steel Company of America is the large improvement this year over last in export orders. Foreign railroads are buying steel springs in larger quantity than ever before. They are also heavy purchasers of tool steel for their shops.

Representatives of the Allis-Chalmers Company in the Pittsburgh-Cleveland district state that business in the electrical industry is rapidly picking up, giving as an evidence of this the fact that in their territory alone contracts closed during the month of October aggregated 68,500 kw.

The Riter-Conley Mfg. Company, Pittsburgh, has taken a contract for a pipe line for the Los Angeles aqueduct, San Fernando siphon, 5 ft. 6 in. to 8 ft. in diameter, amounting to about 4300 tons.

The report is untrue that the Allegheny Steel Company, Pittsburgh, whose works are at Brackenridge, Pa., has leased the plant of the Avonmore Steel Company, Avonmore, Pa., and will use it to make ingot molds. Inspection of the plant was made with a view of leasing it and operating the open-hearth furnace to increase the supply of steel needed to balance the rolling capacity at Brackenridge, but the furnace was found to be too small to be considered.

The Apollo Steel Company, now building a six mill sheet plant at Apollo, Pa., will use electric drive exclusively, having made a contract with the West Penn Traction & Water Power Company for the necessary current. A 1500-hp. General Electric motor is now being installed in the sheet plant.

The Ingram-Richardson Mfg. Company, Beaver Falls, Pa., has decided to disband the Porceliron Company, which it owned, and merge the two under its own name. The subsidiary company was organized about a year ago for the purpose of manufacturing enameled sheet steel ranges, kitchen tables, etc. Work has begun on a new two-story building, 30 x 300 ft.

The property, rights and franchises of the Pressed Radiator Company of America, at West Pittsburgh, Pa., have been transferred to Frederick C. Perkins for $200,000 by the Fidelity Title & Trust Company, Pittsburgh, trustee for the bondholders. The plant has continued in operation, employing about 130 men. Mr. Perkins represents a new company which will probably be organized this week and will shortly take over the plant.

The Pittsburgh Coal Company has issued a circular to its sales representatives, naming prices on coal contracts for the full year 1913 at $1.30 per ton for mine-run and nut, $1.40 for ¾-in., $1.55 for 1¼-in. and 90c. for slack. The circular prices for the present year, which were cut more or less, were $1.22½, $1.32½, $1.47½ and 82½, respectively. The contract coal market is now opening, with some operators quoting the old circular prices and others naming $1.25, $1.35, $1.50 and 90c., respectively.

The Pittsburgh Crucible Steel Company's Midland furnace will be blown out this week for relining and repairs. It has made a remarkable record on its present lining.

The Forged Steel Wheel Company, Butler, Pa., an identified interest of the Standard Steel Car Company, has placed contracts for two merchant bar mills and necessary equipment.

The report that the Firth-Sterling Steel Company, Pittsburgh, has taken large orders for projectiles for Russia is untrue. It does not make projectiles and has not been in cable communication with St. Petersburg or other foreign countries as stated.

The Standard Chain Company, Pittsburgh, whose plant at York, Pa., was burned down about two years ago, has decided to erect a new works on the site, the buildings to be of steel and brick construction.

The Pittsburgh Steel Company has leased the F. J. Horn building in Kansas City, Mo., and will make it a distributing point for Western trade. Stocks of wire and wire nails will be carried, and a number of traveling men will work from that city. The products will be shipped to Kansas City by water.

The plant of the Shenango Iron & Steel Company at Wheatland, Pa., which was bought some months ago by Max Solomon, a scrap iron dealer in the Oliver Building, Pittsburgh, and others, is being prepared for operation about January 1. The plant contains 26 puddling furnaces and some finishing mills, and the output will be grooved and sheared iron skelp in all sizes.

Bath Tub Combination Must Dissolve

The so-called bath tub trust has been decided by the United States Supreme Court to be a combination in restraint of trade and must be dissolved. The decision was rendered November 18 on appeal from the United States District Court for Maryland. The original suit was brought against the Standard Sanitary Mfg. Company and other manufacturers of enameled plumbing goods. The manufacturers had been bound together in combination through license to use a patented apparatus on condition that they would abide by an attached price list, would not sell to jobbers who bought from independents, would not sell in certain territory and would not sell "seconds." The patent was owned by the Standard Sanitary Mfg. Company, and its use is stated to have greatly reduced the cost and the selling price of bath tubs. The company says that this decision means a rearrangement of the manufacturing methods of the other companies unless there is some course open whereby its advantages can be shared.

The decision appears to confirm the contention that it is illegal for the manufacturer or owner of a patented article to fix a price at which the article must be sold at retail, thus compelling other dealers to maintain the fixed price under penalty of having their purchasing orders rejected for any violation of this stipulation. The Supreme Court has laid down the broad principle that there can be no monopoly in the unpatented product of a patented machine without violating the Sherman anti-trust law. The decision of the court was unanimous.

The Griscom-Russell Company, Massillon, Ohio, successor to the Griscom-Spencer Company, Russell Engine Company and James Reilly Repair & Supply Company, will abandon the plant formerly operated at Jersey City, N. J., and a good part of the equipment will be removed to Massillon. To take care of this machinery, some enlargements to the Massillon plant will be made. An additional story will be raised on one of the present buildings in which a new machine shop will be installed. A new one-story building, 40 x 238 ft., is being erected, which will be fitted with Detroit-Fenestra steel sash, supplied with boiler shop equipment and used for the manufacture of feed-water heaters. A pattern storage building is also being erected.

A Joint Armor Plate Contract.—The Swedish Government has placed an order with the Bethlehem Steel Company and the Carnegie Steel Company for 1000 tons of armor plate. There were bids from other countries. The contract was awarded jointly to the two companies named.

Furnace D, of the Bethlehem Steel Company, South Bethlehem, Pa., was blown out last week for repairs. It was operating on basic iron.

Effect of War on Chrome Ore Prices

Some interesting data are furnished by E. J. Lavino & Co., Philadelphia, Pa., as to conditions prevailing in the market for chrome ore or chromite as a result of the Balkan war. That copper was adversely affected, through the hesitancy of European consumers to buy ahead because of the menace they saw in a possible spread of the conflict, is generally admitted, and it also has been pointed out that the higher prices of ferromanganese are in part due to the fact that the war brought about higher ocean freight rates for manganese ore. Not so generally known and commented on, however, is the fact that magnesite and chrome ore which, as refractory materials for the lining of steel-making furnaces, enter into the making of steel, have been affected by the war, particularly chrome ore, inasmuch as Turkey and Greece are the leading sources of supply.

Lavino & Co. state that the stocks of Turkish chrome ore in this country are at low ebb because of the interruption of work in the mines which followed the outbreak of hostilities. In some cases, according to the company's information, the mines were practically deserted, the Greek, Turkish and Bulgarian laborers going to the front to join their respective armies. In reply to a request for information, Lavino & Co. say:

"With the present activity in the steel business, both here and abroad, there has been an abnormal demand for chrome ore and this, with the shortage of supply, has caused prices to advance, to say nothing of the advanced ocean freights of the last year all over the world and the fact that exorbitant rates are at present being asked by ship owners in case their vessels load at Greek or Turkish ports. In addition, the insurance companies demand rates commensurate with war risks and prices must be figured to include these extra costs. Prices of chrome ore are very firm at present and probably will continue so throughout next year. Turkish and Greek ores which average 40 to 45 per cent. chromic oxide vary from $13 to $15 per ton of 2000 lb., f.o.b. cars seaboard, according to the size of the lots. There is considerable Rhodesian ore, known to the trade as Imperial ore, which is of higher grade and averages between 50 and 52 per cent. in chromic oxide and therefore, under normal conditions, commands higher prices than the Turkish and Greek ores. The advance in ocean freight rates has also somewhat affected the price of this ore. Ordinarily it brings about $1 per ton more than the Turkish and Greek ores but today its price is relatively the same."

Magnesite, coming from Austria, has been affected by war conditions, but to a less extent.

International Harvester Company's Iron and Steel Operations

In the last issue of the Harvester World, published by the International Harvester Company, H. F. Perkins, manager of the raw materials division and president of the Wisconsin Steel Company, speaks of some of the extension work of the company in his department as follows:

"In the mountains of Eastern Kentucky, on the coal lands of the Wisconsin Steel Company, there are just being completed extensive coal mines and 300 coke ovens, and with them a town of perhaps a thousand people has been built, equipped with commissary, school, churches and a Y. M. C. A. building, which in the month of October was dedicated to the interests of this working community.

"We have begun to do business upon the great waters through the launching of our good ship, the Harvester, which went into commission about a year ago to bear its burden of 10,000 tons of ore each trip from the docks of the upper lakes to the steel works at South Chicago.

"One of our most interesting developments has been the washing plant at the Hawkins mine, with its connecting railroad to the ore pit. This installation, designed to concentrate the leaner ores in the big Hawkins deposit, has proved remarkably successful, having at times turned out in a day of 24 hours over 4000 tons of concentrated ore of a most superior quality.

"At the steel mill, to meet the expanding conditions, a new mill has been designed and this winter will see its construction under way to add to the range and volume of steel bars available for the company's uses."

In the same issue of the above paper are interesting illustrated articles dealing with the company's steel works and iron mining operations. The former is by Thomas H. Jewell, superintendent of rolling mills, and the latter by M. Trewhella, superintendent of the Agnew mine at Hibbing, Minn.

Percentage of Production of the United States Steel Corporation in 1911

The American Iron and Steel Association presents the following table in Part II of its Annual Statistical Report for 1911, just issued:

Iron ore shipments from Lake Superior and iron ore production in 1911; also coke production in the same year.	By U. S. Steel Corporation.	By independent companies.	Total shipments and production.	Percentage U. S. Steel Corporation.
Shipments of iron ore from the Lake Superior region in 1911.....gross tons.	17,806,257	14,986,873	32,793,130	54.3
Total production of iron ore in 1911 (approximate for independents)...gross tons.	19,933,631	25,617,002	*43,550,633	45.8
Production of coke in 1911.....net tons....	12,120,212	23,431,277	35,551,489	34.1
Iron and steel actually produced in the calendar year 1911. Gross tons.	**Production U. S. Steel.**	**Production all others.**	**Total production.**	**Percentage U. S. Steel.**
Spiegeleisen and ferro-manganese.....	140,917	43,801	184,718	76.3
Bessemer, basic, low-phosphorus, foundry, forge, ferro-silicon, etc.....	10,603,980	12,860,849	23,464,829	45.2
Total pig iron, including spiegeleisen, ferro-manganese, ferro-silicon, etc.....	10,744,897	12,904,650	23,649,547	45.4
Bessemer, open-hearth, crucible, electric, and all other steel ingots and castings.....	12,753,370	10,922,736	23,676,106	53.9
Steel rails, including Bessemer, open-hearth, electric, rerolled, renewed, etc.....	1,583,942	1,238,614	2,822,556	56.1
Structural shapes.....	898,466	1,013,901	1,912,367	47.0
Plates and sheets, including black plates for tinning.....	2,052,115	2,435,934	4,488,049	45.7
Wire rods.....	1,586,594	863,859	2,450,453	64.7
Other finished rolled products, including nail plate, iron rails, merchant bars, etc....	2,582,707	4,783,039	7,365,746	35.1
Total finished rolled, including rolled forging blooms and rolled forging billets.	8,703,824	10,335,347	19,039,171	45.7
Wire nails.....kegs of 100 pounds.	6,900,916	6,536,862	13,437,778	51.4
Tinplates and terne plates.....gross tons.	476,036	307,924	783,960	60.7

*Includes 40,989,808 tons of iron ore "marketed" (or shipped) and 2,560,825 tons added to stock piles in 1911.

The Twist Drill Export Trade

Conditions in the Orient and Australia

Commercial Agent D. C. Alexander, Jr., furnishes the following article to the Daily Consular and Trade Reports of the Bureau of Foreign and Domestic Commerce:

Prior to the extended use of high-speed steel twist drills, American twist drills held the market in Japan, China, the Straits Settlements, India, and Australia. In all but the latter country, a New York company now defunct introduced the Cleveland twist drill, in which it did a very large business and carried good stocks. Other firms introduced drills from other American makers, and did more or less business, depending upon the energy with which the competing drills were pushed.

With the introduction of high-speed steels, every British maker of high-speed steel put a line of such drills on the market. The travelers for these steel makers pushed their respective high-speed drills, high-speed files, etc., so energetically and with such unrestrained praise of their good qualities that for the time many of the consumers believed that British twist-drill manufacturers had outdistanced the Americans.

Recently shop managers in this part of the world have come to realize that they have paid absurd prices for high-speed steel drills, etc., and most of them would welcome the chance to resell what they have in stock at half or less of its original cost. As a result, American twist drills are rapidly returning to favor. For example, the stores schedule of the South Australian Railway and Government departments for 1911-13 shows that most of the twist drills contracted for in this period are to be either Cleveland or Morse, whereas in previous years the contracts have been made for "special" steel drills from various British makers. I believe that the same is true of the stores schedule for other Australian States.

Some of the large engineering establishments, especially those which have buyers in London, import their drills direct in fairly large quantities; but generally twist drills are purchased in small quantities from local dealers. Every hardware house and every engineering supply firm keeps some stock of drills. A portion of such stocks will always be high-speed drills for the consumers who have machines adapted to high-speed drilling; but as 75 per cent. of the drilling machines now in use in the countries named in the beginning of this report are slow speed, many of the old-style drills are still stocked.

Twist drills to be shipped to Japan, North China, or Australia may be prepared and packed in the same manner as for the domestic or European market, except that nothing less than 1-in. lumber should be used for cases. For damp and tropical countries, like British India, the Straits Settlements, the Philippines, and the Dutch East Indies, special precautions must be taken against rust. Any manufacturer who is willing to incur the small additional expense entailed by the following suggestion will be well repaid by freedom from complaints of rusted goods and by the popularity of his packing among the dealers. After sand blasting or final cleaning, the drills should be boiled in a solution of lime, which has the effect of filling the pores of the steel. Then, after a thorough drying, they should have a heavy oil brushed in (lard oil or rapeseed oil is probably as good as any other), after which they should be wrapped separately in some coated paper that will not absorb the oil.

Since twist drills are used to a considerable extent by native workmen and are often sold by native merchants, a good and distinctive trademark on them is a valuable asset to the manufacturer. The native workman is not likely to learn the name of the manufacturer, but he will, if he likes the tool, continue to ask for it by the trade mark or "chop." For example, the Javanese workman who wishes one of the tools imported by Carl Schlieper always refers to it as "tjap mata" (eye brand).

A meeting of the Efficiency Society is to be held in Chicago, November 25. It will be a dinner meeting and is in charge of the Chicago Meetings Committee, of which W. H. Hodge, of H. M. Byllesby & Co., is chairman. A dinner meeting of the society is also to be held in New York November 29 and the subject is "Organizing an Industry."

Judge Gary's Inquiry Into Cost of Living

The Wall Street Journal makes the following interesting statement and in connection with it says that R. A. Gill-Smith, "a student of political economy," endorses Judge Gary's view and makes the curious proposal that as a means of preventing a continual rise in the cost of living, labor of all kinds be standardized and maximum rates of wages be fixed by law:

"When Judge Elbert H. Gary of the United States Steel Corporation went abroad two years ago, he had a double purpose in his mission: First, rest and recreation, and, second, to ascertain if possible the underlying cause for the constantly increasing high cost of living. Being a close student of political economy and governing conditions generally, Judge Gary had, for nearly two decades, observed the constantly growing cost of living in all grades of society and walks of life in various parts of the civilized world; and he determined if possible to fathom the cause, discover the reason, or at least obtain (if he could by investigation) some explanation of the hitherto unexplained metamorphosis in living cost.

"Judge Gary concluded that the best mode of procedure to this end was to make diligent inquiries of people in all walks of life in the different countries affected. He started on board the outward bound steamer, continued his investigations among railroad porters, guards, ticket sellers, and other greater and lesser railroad employees; shop keepers and their employees, cab drivers, laborers, and all sorts and conditions of men in England, France, Germany, Belgium, Italy, Switzerland, and other countries through which he traveled. A general review of the opinions thus obtained convinced Judge Gary that the increased and increasing cost of living is due almost, if not entirely, to the advance in laborers' and workingmen's wages."

Baldwin Steel Company to Resume

The Baldwin Steel Company, Charleston, W. Va., is about to begin operations under new management. The property was at a standstill for two years following the death of its principal owner, Samuel W. Bowne, of New York. The company which has undertaken the operation of the plant is headed by Joseph Krieg, as president and treasurer, with A. Boerder as general manager, metallurgist and secretary, and J. C. Pape in charge of the New York office, 30 Church street.

Mr. Krieg states that the company will make a specialty of cast steel gears and sprockets for automobile trucks, as well as other automobile castings, axles and cylinders. It will resume the manufacture of the Hudson Baldwin high-speed steel, the Ajax self-hardening steel, Extra Baldwin die steel, Baldwin crucible cast tool steel and Special spring and machinery steel. He also announces that the company will enter the market with billets, ingots and forgings in all grades of steel, and chrome, nickel and vanadium steels.

Improvements to the plant have been under way since June. To the old equipment have been added a steel foundry, a clay pot plant, for the operation of which foreign clays will be imported; a cold rolling mill, a cold drawing mill, tempering furnaces, etc. It has two crucible furnaces with a capacity of 54 pots in all, six steam hammers, two hot rolling mills, and a laboratory containing testing machines. The plant, which is located on the Kanawha River, will be operated with natural gas.

Shortage of Iron Mining Labor.—Reports from the Lake Superior iron ranges are to the effect that the shortage of labor which is restricting operations in various districts is becoming more pronounced in the mining country, notwithstanding it is the season of the year when surface work in general is curtailed. There is a continued exodus of natives of the Balkan countries, as well as a brisk movement of foreign-born men to Europe for the Christmas holidays. At the Cleveland-Cliffs Iron Company's Negaunee mine, Marquette range, 100 men are needed, the new shaft having recently gone into commission. Both mining and stripping operations are seriously retarded in some fields of the Mesaba range, and the scarcity is expected to last through the winter. A similar labor shortage exists in the lumber woods.

The Machinery Markets

Trade conditions in the machinery industry while varying here and there are good practically everywhere and orders previously placed, together with the influx of current business, are keeping manufacturing plants busy. Even where activity has temporarily subsided it is pointed out that conditions are better than they were a year ago. New York has had activity which can be called better than fair, although in the week just passed there was a quieter tendency. In Philadelphia sales and inquiries are encouraging and the Pennsylvania Railroad is a factor in the market. The New England manufacturer who is not busy is a rare exception and there have been a few price advances. In Cleveland there was an improvement over the week previous, with widely scattered sources contributing to trade. Chicago's excellent activity has continued and purchasers want prompt deliveries. In Cincinnati foundry supply companies are more active than at any time in years, electrical machinery and gas engines are in very good demand and the railroads are doing some buying, but the export business is rather quiet. Detroit shows improvement with motor driven machines specified to a marked extent, although sales are small individually. In St. Louis conditions are similar with a comfortable run of single tool business. Inquiries are coming out in good volume in the Central South, although recent orders have been rather light. The demand for power and mining machinery in Birmingham is sustained. Texas continues to be busy in every direction and there are better prospects in Mexico. The Pacific coast is doing better than it was a year ago, though small orders predominate. Canada's demand for machinery is unabated and the volume of trade is in excess of that a year ago.

New York

NEW YORK, November 20, 1912.

Conditions have continued very fair in the New York market despite the fact that there has been apparent in the last week a little hesitancy in the placing of orders and inquiries have fallen off a trifle. At the same time there are pending several prospects which will be productive of excellent business. They are scattered over a wide territory and transactions which have been closed have been equally scattered. The Pennsylvania Railroad, whose requirements for its lines east of Pittsburgh have been anticipated, is now coming stronger into the market for shop equipment. The Boston & Maine list has not yet appeared. The Morrow Mfg. Company, Elmira, N. Y., has added to its recent purchases by placing an order amounting to $18,000 for machine tools, all with one house. A few other good orders have been placed and the miscellaneous trade has maintained its good volume.

The Degnon Realty & Terminal Company, Hunters Point avenue, Long Island City, N. Y., has had plans prepared for and will erect at once a ten story building, having a floor space of 800,000 sq. ft., which will be constructed of reinforced concrete and steel, upon its property at Long Island City. This plant will involve an outlay of about $2,000,000. It will be occupied by the Loose-Wiles Biscuit Company and will be equipped with modern devices for rapid and economical handling of material required in its manufacturing processes.

Permits have been issued to the Seltzer Bennett Company for the erection of a factory for the manufacture of fertilizers on Avenue R, Newark, N. J. The plant will consist of two buildings, 45 x 74 and 64 x 128 ft., respectively, a boiler house, 32 x 45 ft., a naphtha storage building, 30 x 39 ft. and an office building, 22 x 30 ft., all to be one story of corrugated iron and steel construction. The company announces that it plans erecting other structures on this plot in the near future.

The Irvington Mfg. Company, Irvington, N. J., has had plans prepared by Frederick A. Phelps, architect, for an addition, 64 x 130 ft., to its factory on Hoyt street at an estimated cost of $10,000.

Plans are being prepared for a factory, dry kiln and power house to be erected on Bleecker street, Utica, N. Y., by the Century Cabinet Company, Fort Plain, N. Y. Griggs & Holbrook, 3 William street, New York City, are the engineers in charge of construction.

A factory 50 x 97 ft., two stories and basement, for the manufacture of drug specialties, is to be erected at Court and Alice streets, Binghamton, N. Y., by W. H. Loveland & Co. Architect C. E. Vosburg, Savings Bank Building, has prepared plans and will receive bids.

A contract has been awarded by the Binghamton Paving Block Company, Binghamton, N. Y., for the construction of an additional plant at Broad avenue and Beaver streets.

The George Zett Brewing Company, Syracuse, N. Y., has plans in preparation for a bottling works building of steel and concrete construction to be added to its plant. The estimated cost, with equipment, is $50,000.

The Hammond Steel & Forging Company, Solvay, N. Y., has been incorporated with a capital stock of $75,000 and will take over and continue the business of the Solvay Steel & Forging Company. The plant will be enlarged and equipment added to greatly increase the output. C. W. and F. F. Gibson and D. G. Geyer, Syracuse, are the directors.

The Binghamton Boiler Compound Company, Binghamton, N. Y., has let a contract for the construction of a factory building 25 x 150 ft., one story and basement.

Ground has been broken for another large addition to the plant of the Chadwick Bleachery, Newburgh, N. Y., following two other additions recently completed. All of the new buildings are to be used for dyeing and bleaching.

The Pfleuger Piano Company, Scarsdale, N. Y., has been incorporated with a capital stock of $40,000 to manufacture piano players. F. C. and M. M. Pfleuger of Scarsdale and A. Behning of New York City are the incorporators.

The Rondout Rubber Company of Kingston, N. Y., recently incorporated, is having plans prepared for a plant for the reclaiming of scrap rubber, which it will erect at Rondout, N. Y.

A large extension is to be made to the plant of the Batavia & New York Woodworking Company, Batavia, N. Y., upon land recently purchased adjoining.

The A. W. Irwin Company, Inc., Rochester, has filed incorporation papers with a capital stock of $50,000 and will engage in the manufacture of turnstiles and other mechanical devices. A factory is being arranged for. A. W. Irwin, W. N. Barnum and F. W. Sangster, Rochester, are the incorporators.

The Brockway Motor Company, Cortland, N. Y., George Brockway, manager, is taking bids for the construction of a manufacturing plant 40 x 208 ft., one story, of concrete block construction. A considerable amount of machinery equipment will be installed.

The American Can Company, New York, is receiving bids for the erection of a factory building 68 x 152 ft., one story, and a manufacturing and warehouse building 68 x 152 ft., three stories, for its plant at Rome, N. Y.

The Faultless Mfg. Company, Buffalo, N. Y., has been incorporated with a capital stock of $10,000 to manufacture spring beds, metallic dies, etc. A plant for the purpose is being arranged for. William H. Lee, William H. Fleischman and Percy A. Lansdowne, 1006 D. S. Morgan Building, are the directors.

Plans are being completed for a foundry building about 400 ft. in length which the Otis Elevator Company will add to its plant at Northland and Sheridan avenues and the New York Central Railroad belt line, Buffalo. Complete and up-to-date equipment will be installed, including electric cranes, conveyors, etc.

The Hollenbeck Specialty Company, Buffalo, has been incorporated with a capital stock of $10,000. Eugene S. Hollenbeck, 40 West Mohawk street; George H. Marvin, Buffalo, and Frank L. Smith, Silver Creek, N. Y., are the directors. The company will manufacture special machinery and tools, and is equipping a factory with requisite facilities.

The Buffalo Broom Corporation, Buffalo, is building a factory, storehouse and office at Keystone street and the Lackawanna Railroad.

The King Sewing Machine Company, Buffalo, is

adding to its plant at Rano and Welland streets and the Lackawanna Railroad a one-story brick annealing building.

The Stewart Heating Company, Buffalo, is building an addition to its plant for the manufacture of boilers and heaters at Norfolk avenue and the Erie Railroad.

The Pomeroy-Stellrecht Company, Inc., Buffalo, has been incorporated with an authorized capital stock of $10,000, and will conduct a general machinery manufacturing business. The directors are William S. Pomeroy, Conrad Stellrecht and Joseph Keller.

New England

BOSTON, MASS., November 19, 1912.

Business continues consistently good in machine tools and allied lines, including mill supplies of all descriptions. A few advances in prices of machinery are noted, and others are imminent, according to hints received by dealers from manufacturers. The tool steel dealers report a large demand. Boston houses which cover the whole country for foreign steels have some reports from western representatives which indicate that certain somewhat isolated sections are not so busy as the Middle West and East. But in New England the manufacturer who is not doing a good business is the rare exception, nor has any sign of reaction developed in the past fortnight.

The Boston & Maine list of machine tools for the Billerica shops is practically ready to send out to the dealers. Its total is large, probably more than $250,000. The announcement should be made before the month closes.

New England manufacturers and shippers generally are disturbed keenly because the Grand Trunk Railroad has discontinued the construction of its proposed New England lines. The line from Palmer, Mass., to Providence, R. I., is already well toward completion, and this section will probably be finished. But the understanding is that the connections between this division and Boston, Worcester and other places, and a line from Vermont through New Hampshire and Massachusetts to Boston are abandoned projects. The reason for this change of plan is a proposed traffic arrangement with the New York, New Haven & Hartford system, including the Boston & Maine. The agreement will probably preclude the establishment of repair shops in this territory by the Grand Trunk management.

The chance is small that the mine of the Rhode Island Coal Company at Portsmouth, R. I., will be operated hereafter. The company is in bankruptcy, and the report of a mining expert is said to be unfavorable as to the value of the mineral. The mine is a very old one, in fact one of the oldest in the country, and the attempt to utilize its coal has been made several times.

The E. Stebbins Mfg. Company, Springfield, Mass., manufacturer of brass plumbing goods, will be reorganized. All creditors will be paid in full and the capital increased from $50,000 to $100,000, the new securities being in the form of preferred stock. The board of directors will be increased from three to five, and will consist of Frederick Harris, L. J. Powers, F. L. Chapin, Joseph Shattuck, Jr., and Charles H. Downs.

The Baush Machine Tool Company, Springfield, Mass., has brought out a new type of boiler shell drilling machine, to drill boiler shells, after they have been rolled up, from 36 to 72 in. in diameter, and 10 ft. long without resetting, and 20 ft. long by reversing.

The American Brass Company, Waterbury, Conn., will erect a tube mill as an addition to its Benedict & Burnham plant at Waterbury. The building will be of brick and steel, 199 x 224 ft., one story.

Work has been started on the addition to the tube mill of the Bridgeport Brass Company, Bridgeport, Conn., which will be 50 x 360 ft., of brick and steel.

The Seamless Rubber Company, New Haven, Conn., will build an addition to its works, 60 x 200 ft., with an ell 40 x 60 ft., two stories of brick, mill construction.

The Central New England division of the New York, New Haven & Hartford Railroad has let the contract for a repair shop to be located at Maybrook, Conn.

Additions to general manufacturing facilities of New England, include the following. Dustbane Company, Ipswich, Mass., factory to replace plant destroyed by fire; John W. Wood Elastic Web Company, Stoughton, Mass., one story addition, 60 x 80 ft.; H. J. Mills, Bristol, Conn., paper boxes, additional story to factory and three story addition 30 x 40 ft.; Timson & Co., Lynn, Mass., two-story factory at Swampscott, Mass., to contain 17,000 sq. ft. of floor space; Atlantic Rubber Company, Hyde Park, Mass., tentative plans for large works to be erected in the spring.

A part of the works of the George E. Wood Tool Company, Southington, Conn., a branch of the Stanley Rule & Level Company, New Britain, Mass., was burned November 12, with a loss of $15,000. It is understood that the damaged building will be replaced.

The manufacturing property at Hyde Park, Mass., owned by the Marshall Electric Company, has been sold to the Lenox Motor Car Company, Boston, Mass., including the shop equipment. The new owner will occupy the premises immediately.

Philadelphia

PHILADELPHIA, PA., November 19, 1912.

More encouraging reports as to the volume of current sales as well as inquiries are noted from both merchants and manufacturers. Some of the business which has been under negotiation for considerable time has been closed and the trade generally feels that buying will show a betterment. The buying has not been broad, being confined largely to equipment for extension and replacement. The inquiry is also principally for single and small groups of tools. The apathy in railroad inquiry was broken in the week by requests for quotations on a list of tools for the Pennsylvania Railroad. While few propositions involving large purchases of tools or machinery equipment have developed recently, several moderate projects are in sight and it is believed that some negotiations will develop into early orders. Business in the second-hand machinery markets has been rather quiet. Export business shows little improvement, although in established specialty lines a good demand continues.

The Pennsylvania Railroad has sent out inquiries for 10 or 12 tools, several of which are intended for its Altoona shops. They include a 90-in. wheel lathe, several small lathes, a shaper, boring mill, grinder, etc.

The Merchant & Evans Company has removed its tin plate dipping plant, located in this city, to its new plant at Warwood, W. Va., and is now considering additions to its local plant at Twenty-first street and Washington avenue, in the way of increasing the mechanical department, for which some additional machine tool equipment will ultimately be required.

The Smith-Hansell Company, Camden, N. J., has been incorporated under New Jersey laws with a capital stock of $100,000, to manufacture and deal in all forms of iron, steel and other metals. The incorporators named are G. H. B. Martin, John S. MacPeak and T. S. Gorman.

The Water Board of Baltimore, Md., is asking for proposals which will be received until December 4, for the construction of a steel conduit, 10 ft. in diameter, and approximately 2465 ft. in length, under what is known as Lock Raven contract No. 3. About 33,000 lb. of concrete reinforcing bars will also be required. Specifications may be obtained from the office of the Water Engineer, City Hall, Baltimore, Md.

The Keith-Gara Company, Thirtieth and Ludlow streets, manufacturer of stamped and metal specialties, has been adjudged a voluntary bankrupt. Benjamin H. Ludlow has been appointed viewer of the bankrupt estate. Several weeks ago it was reported that this company would erect a new plant in Chester, Pa.

For the second time in several months fire badly damaged the stove plant of the Abram Cox Stove Company, American and Dauphin streets, this city, on November 12. The loss is estimated at $75,000, and includes damage to the No. 3 foundry, flask shed and part of the warehouse. No material delay in resuming operations is expected, the foundry department being again in operation this week.

The Energy Elevator Company has been extremely busy on all classes of work. Automobile elevators, both hand and power driven, have been in particularly good demand, as have also residence passenger and apartment house lifts. Business has been exceptionally good in the South and West. The energy plant has been operated overtime for months and has enough orders on hand to keep it fully engaged for a long period.

The trustees in bankruptcy of C. H. A. Dissinger Brothers & Co., Lancaster, Pa., manufacturers of gasoline engines, sold the plant at public sale November 12. J. L. Straub, Lancaster, Pa., is the reported purchaser, who, it is stated, will operate the plant.

The Baldwin Locomotive Works has received orders for 50 consolidation locomotives for the Boston & Maine Railroad for next year's delivery. Orders have also been booked for 35 switching engines—24 for the Chicago, Milwaukee & St. Paul, 6 for the Omaha and 5 for the Chicago, Burlington & Quincy. The Baldwin

plant is running at full capacity, with sufficient business booked to keep it so occupied the entire winter. The employees now number 18,000. The new erecting shop at Eddystone, Pa., has recently been completed and is now being used in its entirety.

The Tacony File & Hardware Company will, it is stated, erect a factory building, 21 x 100 ft., two stories, at 6744 Wissinoming street, Philadelphia, Pa., to extend its manufacturing facilities.

The Bridgeton Iron Works, Bridgeton, N. J., will rebuild its plant which was recently damaged by fire. Details regarding the construction work are, however, not available.

Detroit

DETROIT, MICH., November 19, 1912.

The volume of business transacted in the local machinery market the past week shows considerable improvement, although sales were small individually. Inquiries also were more plentiful and these seem to develop satisfactorily and close easily. The market for woodworking machinery is rather narrow. Small tools and machine shop supplies are in good demand, indicating that many shops are adding to their forces. Second-hand machinery is active and this class of equipment is moving freely. Motor driven machine tools are experiencing a strong demand. Some new work is reported in building circles and contractors are fairly busy.

The reorganization of the United States Motor Company, with the consequent prospect for the resumption of activity in such plants of the corporation as were closed, is causing considerable interest in machinery circles and the reorganization of the R-C-H Corporation and of the King Motor Car Company is also of interest.

Following the increase of its capital stock to $90,000, the Michigan Steel Castings Company, Detroit, has acquired additional land adjoining its plant on Guoin street and will extend its foundry. The company reports an excellent volume of business.

The American Nut Products Company, Detroit, has been incorporated with $3,500 capital stock, to manufacture machine shop supplies, etc. The incorporators are C. B. and C. A. Whitman, Otto Lang and A. J. Spink.

The Detroit Forging Company, Detroit, has completed plans for the erection of a three-story brick factory, 33 x 100 ft., at 92 Iron street, to cost $10,000.

The United States Tire Company, Detroit, is building an addition to its plant on Jefferson avenue. It will be used as a machine shop, it is stated.

The Kelsey Wheel Company, Detroit, suffered a loss by fire, November 10, to the extent of $5,000. The bending and wheel departments were affected. Repairs will be made at once.

The plant and business of the Ideal Mfg. Company, Detroit, manufacturer of plumbing supplies, etc., have been purchased by the Colwell Lead Company, New York City. The plans of the purchaser contemplate an increase in the capacity of the local factory and the introduction of additional lines of products.

Upon the petition of creditors, the Triumph Mfg. Company, Detroit, manufacturer of motorcycles, has been adjudicated bankrupt and the Security Trust Company named as receiver. The plant will be continued in operation.

The Cadillac Novelty Company, Detroit, has been incorporated with $5,000 capital stock to manufacture specialties. The incorporators are J. J. Freeman, H. S. Rogers and Jesse Drake.

Joel G. Phipps and associates, Detroit, have organized a new company to be known as the Phipps Electric Automobile Company, and propose to begin the manufacture of electric motor cars.

The Chalmers Motor Car Company, Detroit, has begun the construction of a one-story brick addition to its factory.

The Van Blerck Motor Company, Detroit, manufacturer of marine motors, has filed notice of an increase of capital stock from $10,000 to $100 000.

Joseph Schefges is at the head of a new company which has been formed at Wyandotte, Mich., to engage in the foundry business. A site has been secured and a one-story foundry building, 100 x 150 ft., will be immediately erected and equipped. Brass, aluminum and gray iron castings will be made.

The Truesdell Marble & Granite Company, Port Huron, Mich., whose plant was recently destroyed by fire, will not remove to Detroit as reported in the daily press, but will rebuild and install new machinery sufficient to considerably enlarge the capacity of its old plant.

The Michigan Mirror & Art Glass Company, Jackson, Mich., has been incorporated with $10,000 capital stock to manufacture mirrors, etc. Frank H. Haynes is at the head of the new company.

The taxpayers of Big Rapids, Mich., at a special election voted to bond the city for $50,000 for waterworks extensions and improvements.

The Grand Rapids Pearl Button Company, Grand Rapids, Mich., has increased its capital stock from $100,000 to $200,000, and will build a new factory and install sufficient additional mechanical equipment to enable it to double its output.

J. A. Richards, Albion, Mich., is at the head of a new company to be known as the Richards Bros. Corrugated Paper Company. A factory will be erected for the manufacture of shipping cases and all kinds of corrugated paper specialties.

Chicago

CHICAGO, ILL., November 19, 1912.

The general demand for machine tools in this market has been more insistent and of greater aggregate volume in the past few weeks than in any similar period during the year. It has been of a particularly desirable character, being made up of moderate individual purchases from a large number and variety of buyers. Much of the purchasing has been done at Chicago stores by the buyer in person, and the very general urgency of their requirements has been emphasized by the number of machines that have been taken from stock for immediate shipment. Sears, Roebuck & Co., in buying a number of tools for its Muskegon, Mich., plant, obtained quotations and bought the tools the same day, the orders being distributed where deliveries could be made from stock. A similar instance is noted with reference to a Minneapolis interest for which a number of machines were bought from Chicago stock, the buyer being unable to wait for factory delivery. The Santa Fé system, which has been in the market for a small list, is the only railroad known to have closed for its needs. The Chicago, Milwaukee & St. Paul and the Elgin, Joliet & Eastern have yet to buy.

Theodore Steuben, 3202 North Lincoln avenue, Chicago, is preparing plans for a new machine shop, 25 x 75 ft., one story.

The Elgin Motor Company, Elgin, Ill., has been incorporated with $20,000 capital stock by Edward J. O'Beirne, E. J. Adamek and Charles D. Adamek to equip a plant for the manufacture of motors.

A. M. Castle & Co., Chicago, whose plans for a new plant at Chicago, have been previously announced, have placed the contract for a warehouse and office buildings, the contract price being $65,000.

The American Brake Shoe & Foundry Company, Chicago, is about to let the contract for an addition 21 x 136 ft., one story, at its West Twenty-sixth street foundry.

The L. Wolff Mfg. Company, Chicago, has awarded the contract for a brick addition to its Fulton street plant, 90 x 124 ft., two stories, to cost $25,000.

The Hubbard Steel Foundry Company, East Chicago, Ind., has purchased a tract of 16 acres adjoining its plant to provide for plant extensions. The consideration was $40,000.

The Challenge Company, Batavia, Ill., has in contemplation the building of an addition to its gas engine and wind mill plant.

The Central Illinois Public Service Company has placed the contract for an electrical generating power plant at Kincaid, Ill. The building will be 110 x 200 ft., and will cost $115,000, exclusive of equipment.

The Free Sewing Machine Company, Rockford, Ill., has increased its capital stock from $100,000 to $1,000,000 for the purpose of enlarging its operations as well as its plant.

The Northey Mfg. Company, Waterloo, Iowa, is arranging to move its plant to Freeport, Ill., where a consolidation with the Savage Ice Making Machine Company has been effected.

The General Machinery & Supply Co., Waterloo, Iowa, has filed notice of incorporation with a capital stock of $20,000. The officers of the company will be W. H. Stewart, president and treasurer; W. L. Northrup, first vice-president and secretary; R. D. Jay, second vice-president.

The Northwestern Malleable Iron Company, Milwaukee, Wis., is preparing plans for the erection of an annealing department to cost $15,000.

The Fairbanks Morse Mfg. Company, Beloit, Wis., has in process of construction an extension to its machine shop, 200 x 224 ft., which will be completed in the early spring.

Indianapolis

INDIANAPOLIS, IND., November 19, 1912.

The Independent Envelope Company, Indianapolis, has been incorporated with $400,000 capital stock. A factory will be erected. The officers are: President, Frank McAllister, vice-president of the Indiana Paper Company; vice-president, O. D. Haskett of the Burnett-Lewis Lumber Company; secretary-treasurer, W. L. Dynes, superintendent of mails at the Indianapolis post office. Other directors are Clarence D. Boyd, traveling passenger agent of the Missouri Pacific Railroad, and W. B. Emerson, paper manufacturer, Columbus, Ohio.

The Standard Tool & Mfg. Company, Indianapolis, has been incorporated with $100,000 capital stock to manufacture tools. The directors are James B. Runner, William Kahl, Charles H. Holt, John T. Huntington and John M. Coulter.

The DeSoto Motor Car Company, Auburn, Ind., has been incorporated with $20,000 capital stock to manufacture automobiles and parts. The directors are L. M. Field, Auburn; Hayes Fry and Glenn Fry, Iowa City, and V. VanSickle and H. J. Clark, Des Moines, Ia.

The Union Reduction Company, Indianapolis, has been incorporated with $100,000 capital stock to build and operate a garbage reduction plant. The directors are J. T. Mooreman, J. P. Goodrich and J. McIntosh.

The Indiana Brick Company, whose plant at Anderson, Ind., was recently destroyed, will rebuild.

The Martinsville Light, Heat & Power Company, Martinsville, Ind., has changed its name to the Martinsville Gas & Electric Company.

The Herçules Gas Engine Company, Evansville, Ind., recently mentioned as having been incorporated, states that it has purchased an engine plant already equipped and will move the business to Evansville. The company is having plans prepared for a factory building, 130 x 170 ft., of brick, concrete and steel construction, which it expects to erect in the spring.

The American Rotary Valve Company, Anderson, Ind., has had plans prepared for the erection of a new foundry, 40 x 90 ft., to be equipped with mechanical molding machinery. Construction begins at once.

The Rockwood Mfg. Company, 1801 English avenue, Indianapolis, has acquired additional property adjoining its present plant to provide for the enlargement of its facilities.

The Standard Steel Car Company, Hammond, Ind., suffered a loss as a result of fire which seriously damaged the power plant, necessitating the shutting down of the works temporarily. Operations will be resumed on purchased power until the plant can be rebuilt.

The Vanadium Spring Horseshoe Company, Richmond, Ind., has been incorporated with $8,000 capital stock to manufacture horseshoes. The directors are Clayton E. Belford, Frank P. F. Wilt and D. S. Wilt.

The Union Heat, Light & Power Company, Union City, Ind., has increased its capital stock from $50,000 to $200,000.

Charles Wolff has been appointed receiver for the Western Launch & Engine Company, Michigan City, Ind., manufacturer of boats and marine engines. The company had $100,000 capital stock.

Cincinnati

CINCINNATI, OHIO, November 19, 1912.

Machine tool builders report the export business as being very quiet, and it is hardly probable that there will be much improvement before the middle of January next. On the other hand, there have been quite a number of scattered orders received from domestic sources, included in which were several from the railroads.

Foundry supply companies are doing a better business than for several years past, and makers of electrical equipment and gas engines certainly have no room for complaint. However, second-hand machinery continues moving somewhat slowly.

At a meeting of the Cincinnati Railway Club, held at the Grand Hotel, on the evening of November 12, A. G. Hall, chief smoke inspector for the city, delivered a very interesting address on "The Abatement of Dense Smoke from Stacks of Locomotives."

The Portsmouth Paving Brick Company, Portsmouth, Ohio, has let contract for rebuilding its plant, recently destroyed by fire. The proposed structure will be 70 x 85 ft., one story. New equipment will have to be substituted for that damaged by the fire.

Sheridan & Kirk, Cincinnati contractors, have been awarded contract for the construction of a government dam on the Ohio River that will cost over $600,000. Some special equipment will have to be provided for later on.

The Modern Foundry Company, Oakley, Cincinnati, has had plans prepared for a small pattern storage building.

The Jones Heel Company, Dayton, Ohio, manufacturer of shoe heels, will make some extensive additions to its plant. Nothing is known as to the machinery requirements.

The Michael Tauber Company, Chicago, has purchased the machinery equipment in the plant of the Owens Machine Tool Company, Springfield, Ohio, that recently suspended operations.

It is stated that the Berry Tile Works Company, Marion, Ind., recently destroyed by fire, will rebuild its plant at once. Special equipment will have to be provided.

It is rumored that a large paper mill will soon be erected at Springfield, Ohio. P. E. Montanus, Springfield, can probably furnish particulars.

The Corcoran Brothers Company, Cincinnati, manufacturers of auto and carriage lamps, will soon begin work on a four-story factory addition to its plant on Reading road, recently mentioned as contemplated.

The Broadway Machinery Company, Cincinnati, second-hand machinery dealer, has leased a large factory building at Front and Pike streets that will be used for storing and repairing machinery of all kinds.

The Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, is reported to have in contemplation the erection of an extensive addition to its plant for which considerable equipment will be required should present plans go through.

The Crown Pipe & Casting Company's plant at Wellston, Ohio, was recently badly damaged by fire. Rebuilding operations will begin at once, but not much equipment will be required, as the machine shop was saved.

The Lagonda Mfg. Company, Springfield, Ohio, has had plans prepared for a new blacksmith shop, and it is the intention of the company to make an extensive addition to its plant next spring.

Cleveland

CLEVELAND, OHIO, November 19, 1912.

The volume of business continues fairly good and some dealers report an improvement over the preceding week. Orders range from single tools to lots of two or three machines. The present demand is largely for medium sized tools and is coming from well scattered sources. Among orders placed in the week was one from a Toledo concern for a large gear hobber. A local automobile maker bought several tools, but orders from this source are rather light. The rubber industry is bringing out a fair amount of business in boring mills and other machinery. Very little business is coming from the railroads. Some lists that are expected from them are not looked for until after the first of the year. The general feeling that business conditions during 1913 will be very satisfactory has not been changed by the recent election. In power plant equipment a large amount of business is in prospect, but most of this is slow in being closed up. Second-hand machinery is moving in moderate volume. Forge shops in this territory are crowded with work.

The Foster Bolt & Nut Mfg. Company, Cleveland, is enlarging its plant by the erection of two brick buildings, one a two-story structure and the other one story with saw-tooth roof. The additions, which will be completed about January 1, will give the company about double its present capacity. Some new machinery will be added, which has already been purchased. The company will add to its present products the manufacture of cold punched hexagon nuts.

The Pittsburgh & Lake Erie Railroad is placing orders for equipment for a new roundhouse at Dickerson Run, Pa. The Cleveland office of the Detroit Stoker Company has received an order for stokers for two 150-hp. water-tube boilers. Orders have been placed for engines and air compressors.

William Frankham has just completed a new two-story plant on East Tuscarawas avenue, Canton, Ohio, to manufacture brass, bronze and aluminum castings.

The question of issuing bonds for various municipal improvements was voted on by a number of Ohio cities

at the recent election. Among the bond issues approved were the following: Kenmore, $100,000 for a water works plant; Wellsville, $60,000 for a municipal electric lighting plant; Lowellville, $45,000 for water works system. Youngstown will shortly receive bids for a water works pumping engine, estimated cost of which is $135,000. The Board of Control, Alliance, has accepted the bid of the Pitt Construction Company, Pittsburgh, Pa., for the construction of a filtration plant to cost $67,000.

The J. H. McLean Company, Canton, Ohio, builder of heating boilers, has just completed an addition to its plant 75 x 210 ft., which will be used for warehouse purposes.

The Ohio Nut & Bolt Company, Elyria, Ohio, is building a brick factory 77 x 110 ft., one story, at Berea, Ohio, and new machinery consisting of headers and nut machinery has been purchased to be installed in the new building. This will considerably increase the output of the company in nuts and bolts and will also supply needed additional storage room.

The Pittsburgh Foundry & Machine Company, Salem, Ohio, will place in operation about December 15 its new foundry, which is being built to replace one that was burned.

The Acme Foundry Company, Cleveland, has increased its capital stock from $100,000 to $150,000, additional capital being required because of plant extensions now under construction and will increase its capacity 25 per cent.

The Walsh Paper Company, Cuyahoga Falls, Ohio, has commenced the erection of a new brick, steel and concrete plant to replace one that was recently burned. New special machinery used in the paper-making industry will be required amounting to about $80,000.

The Summit Silica Company, Barberton, Ohio, which was organized early in the year and has been occupying a small factory, is planning the erection of a new plant 50 x 210 ft.

The Iceless Refrigeration Company, Cleveland, which for some time has been doing a large amount of experimental work and which will shortly place a refrigeration machine on the market, has increased its capital stock from $200,000 to $300,000.

The Hotz Foundry Company, Fremont, Ohio, which recently announced that it will build a new plant, will erect a main building 70 x 120 ft., and a pattern shop 30 x 40 ft. Some new equipment will be installed. The company makes brass, bronze and aluminum castings. George J. Hotz is general manager.

The Central South

LOUISVILLE, KY., November 19, 1912.

The general tone of the iron and machinery business in this vicinity continues optimistic, although some firms report that orders are somewhat slack. Enough are rushed with work, however, to bring the general average up to fair, if not better. Everybody is looking forward to a steady improvement in general conditions, and, as usual, the upward trend of metal quotations is pointed to as an unfailing index of prosperity in all lines of trade. Many inquiries are being received by various local houses and selling agencies for machinery and equipment, and while these may not at once develop into sales, it is taken as a sign of increasing interest on the part of manufacturers in improvements, and an indication that the tight, close-buying attitude characteristic of the past few years is relaxing somewhat.

Grainger & Co. are increasing the floor space of their structural shop, blacksmith shop and ornamental work department by additions aggregating 3000 sq. ft., in order to accommodate additional machinery which will be required in these departments.

The Dow Wire & Iron Company has under construction an addition to its foundry, 45 x 100 ft. The cost of the building will be about $3,000, and the company will be in the market for new bending machinery for its equipment.

Bilger & Harley, a firm recently organized to engage in the general machine and repair business, specializing on safe and lock work, have just purchased of E. D. Morton & Co., Louisville, a No. 10 Valley grinder, with complete equipment, and from the Sebastian Lathe Company, of Covington, Ky., a 15 in. x 6 ft. engine lathe. The firm will put in a drill-press as well, and is in the market for such a machine.

The Glenn-Bauer Motor Company and Hite D. Bowman will consolidate their businesses and conduct a garage and automobile agency at the Bowman establishment on Fourth street. The firm will, it is reported, install a complete automobile repair shop.

The Atlas Machine Company, Nashville, Tenn., is turning out a hoist for the Burnside, Ky., Lumber Company, to be operated by a 9 h.p. gasoline engine, designed for the purpose of handling logs.

The Southern Ice Company, Chattanooga, Tenn., plans the erection of a modern abattoir, to be operated in connection with its ice plant.

The American Zinc Company of Tennessee has purchased at Mascot, Tenn., 2079 acres of zinc land, and proposes the immediate construction of a concentrating plant at that point with a capacity of 1000 tons a day.

The flour mill at Blackford, Ky., owned by Charles Nunn, W. M. De Haven and G. M. Gahagan was destroyed by fire November 10, with a loss of about $4,500. The mill had a capacity of 35 barrels a day. It will be rebuilt.

The wood-working plant of the Paris Mfg. Company, Paris, Ky., was destroyed November 13 by fire, with a loss approximating $15,000. Besides a quantity of lumber and other material, the loss included considerable damage to the company's machinery. C. V. Higgins, Paris, Ky., is the manager of the company.

Pittsburgh interests have purchased several hundred acres of clay lands near Wickliffe, Ky., and plan their immediate development. Paul G. Willets, secretary and general manager of the purchasing company, has the matter in charge.

The installation of the electric lighting plant at Perry, Ky., by W. J. DeBaun is about complete, and the system will be put in operation in a short time.

The Sharpsburg Roller Mills, Sharpsburg, Ky., consisting of a three-story main building, a 25,000 bushel elevator and two warehouses, owned by M. V. Boscain, were destroyed by fire last week, the amount of the loss being about $20,000. The capacity of the plant was 112 barrels.

The Adair Light & Heating Company, Adairville, Ky., has been organized, with a capital stock of $5,000, by M. E. Orendorff, B. M. Pulliam, G. A. Smith and J. B. Fisher, for the purpose of building an electric plant.

W. M. Walkup & Co., Richmond, Va., have received the contract for the construction of the union passenger terminal station at Albany, Ga. A considerable feature is the mechanical equipment.

Birmingham

BIRMINGHAM, ALA., November 18, 1912.

There is a steady demand for boilers and engines as well as pumps in the Alabama field, with somewhat smaller demands from adjoining sections. The Alabama Interstate Power Development Company, Birmingham, claims to be letting contracts for a large amount of appliances needed in the construction of power plants, on the Coosa River, transmission lines, electric towers, etc., in the prosecution of its water power development plans. The coal mines are considerable buyers of engines and boilers, as well as pumps. The larger dealers continue to report a good business all round, while the repair men claim that business is as good as it was prior to the election.

The Bryan Coal Corporation, Birmingham, announces the opening of a new mine at Red Star, in Walker County, and the proposed expenditure of $100,000 for coal washer, etc.

The shale brick plant of L. L. Stevenson of Birmingham, located at Lovick, Ala., was burned, entailing a loss of $50,000. Mr. Stevenson announces that the plant will be rebuilt in more modern shape than before, although there were already many modern contrivances. Much machinery must be replaced.

The W. T. Smith Lumber Company will rebuild its turpentine distillery recently burned at Chapman, Ala.

T. C. Seaman & Co. will establish a stave mill at Tuscaloosa, Ala.

Dr. W. G. Lee heads a committee of the Chamber of Commerce of Macon, Ga., which is looking for a site for a stove factory proposing to remove to that city.

The North America Chemical Company will establish near Rome, Ga., a plant for the manufacture of alum, using halloysite, of which there are large deposits, as a base. H. H. Shackelton, Rome, is interested.

The Manchester Bottling Works, Manchester, Ga., has applied for a charter with a capital stock of $1,500, with privilege to increase to $10,000.

W. L. Kellar will establish a bottling plant in Tampa, Fla.

Frank Spencer of West Palm Beach, Fla., is organ-

izing a company to establish a plant at Lake Worth for the manufacture of brick, etc.

The Tampa Tile & Ornamental Company, Tampa, Fla., has applied for a charter with a capital stock of $20,000. It will make brick, artificial stone, etc. Emilio Sarrior is president and N. Powers, treasurer.

A. T. Green is president and manager of a company being formed at Lawrenceville, Ga., to establish a fertilizer factory.

The International Chemical Company will establish an acidulating plant at Tifton, Ga., to cost $100,000. J. J. Dye, Atlanta, Ga., is engineer in charge.

The New Smyrna Public Service Corporation, New Smyrna, has applied for charter with a $50,000 capital stock. It will establish a gas plant. F. M. Conrad is president and T. E. Fitzgerald, secretary and treasurer.

A. E. Dowman is chairman of the Council committee which is considering the establishment of a municipal gas plant at Decatur, Ga.

The Solomon-Norcross Company, Atlanta, has been commissioned to prepare plans for a municipal lighting and power plant for Eatonton, Ga.

A contract was awarded Osceola Hardware Company for the extension of the water system of Osceola, Fla.

The Williams Wagon Works, Macon, Ga., has purchased a site and it is understood will erect a new plant.

W. Myers, Tifton, Ga., and W. E. Aycock, Moultrie, Ga., will establish a lumber plant with a capacity of 40,000 ft. on a timber tract near Thomasville, Ga.

The Riverside Realty Corporation, A. J. White, president, will install a water works on a 126-acre suburban tract at Fort Myers, Fla.

St. Louis

ST. LOUIS, MO., November 18, 1912.

The distractions of the political period are passing away and there is an improved feeling in the machine tool market, though there has been at no time lack of confidence. No large inquiries have come out in the week, but there has been a comfortable run of business in single tools, with some second-hand machine inquiry. Dealers are optimistic and look for increasing business.

The Barry-Wehmiller Machinery Company, St. Louis, has taken out a permit for the construction of an addition to its new factory under way in North St. Louis. The building will cost $10,000, but no statement is made as to machinery requirements.

The McEwing & Thomas Clay Products Company, St. Louis, with $20,000 capital stock, has been incorporated by A. T. Griesbeck, Charles E. McEwing and Charles P. Tilley to equip a plant for the manufacture of all kinds of clay products.

The Ely & Walker Dry Goods Company, St. Louis, will open a factory at Belleville, Ill., in a short time for the manufacture of shirts, etc., employing about 100 people. The mechanical requirements are not announced.

The Eureka Safety Razor Company, Kansas City, Mo., has been incorporated with $50,000 capital stock by George F. Rich, Edward Smith and John Merkt to equip a plant for the manufacture of a new safety razor.

The Merchants Ice & Coal Company, St. Louis, has purchased land for the erection of a branch plant for the manufacture of ice. Machinery requirements have not been announced.

The Chemical Specialties Company, Kansas City, Mo., has been incorporated with $25,000 capital stock by E. J. Hess, J. N. Greene, A. L. Williams, H. G. Kirkland, H. F. Lea, H. B. Menard and Hunt C. Moore to equip a plant for the manufacture of chemical specialties.

The Franklin Gasoline Company, East St. Louis, Ill., has been incorporated with $50,000 capital stock by P. Sheville Fidding, George S. B. Kight and John L. Morrissey to equip a plant for the refining of gasoline.

The Searchlight Gas Company's plant at Kansas City, Mo., was destroyed by fire November 13 with a loss of $40,000, largely on machinery, etc. It will be rebuilt it is stated.

The Madison County Light & Power Company, Edwardsville, Ill., has increased its capital stock from $100,000 to $135,000 for the purpose of enlarging its plant.

The Grover Rotary Engine & Pump Company, Laduc, Mo., has been incorporated with $8,000 capital stock for the purpose of manufacturing a new type of pump.

The Pioneer Platinum Company, Muskogee, Okla., has been incorporated with $15,000 capital stock by J. M. Givens, J. L. Winner, C. M. Smith, R. R. Clark and P. W. Samuel to equip a plant for the utilization of platinum in various ways.

The St. Francis Box & Lumber Company, St. Francis, Ark., has been incorporated with $20,000 capital stock by Thomas S. Marshall and Wood Howe. It is in the market for mechanical equipment.

The Kansas City Missouri River Navigation Company, Kansas City, Mo., 410 Midland Building, is preparing plans for new machine and repair shops in that city.

An electric plant of 150 hp. and a 10-ton ice plant are to be equipped at Clay, Ky., by the Clay Light & Ice Company, of which C. R. Clark is in charge.

Plans are being prepared, it is stated, for the installation of a 750-kw. turbine in addition to the present plant of the municipal electric light station at Henderson, Ky.

The Guardian Lighting & Industrial Company, Crowder, Okla., has been incorporated with $15,000 capital stock for the purpose of equipping a plant. The stockholders are A. E. Barrow, H. E. Rowton and E. G. Narrow.

The Beare Bros. Ice & Coal Co., Jackson, Tenn, is building a 100-ton daily capacity ice plant under the supervision of its own staff of employees.

Texas

AUSTIN, TEXAS, November 16, 1912.

The demand for all lines of machinery and tools continues exceptionally good. Splendid fall weather has afforded a fine opportunity for the installation of irrigation plants and other outside industrial works. The situation in Mexico seems to be improving and there are indications of a revival of manufacturing and general business in that country.

The Texas Bottle Mfg. Company, Wichita Falls, has been organized with a capital stock of $60,000. It will manufacture glass bottles. The incorporators are J. A. Kemp, Frank Kell and T. S. O'Bear.

The Oleander Compress & Warehouse Company, Dallas, has been organized with a capital stock of $10,000. The incorporators are P. R. Freeman, C. L. Tarver and E. B. Guthrie.

The Pickering Lumber Company will establish a lumber mill at Lampasas, with a daily capacity of 500,000 ft. The machinery and other equipment will be modern in every respect.

The Reliance Tie & Piling Company will establish a plant at Houston for the manufacture of railroad ties and piling. L. E. Ingram, L. Davidson and W. F. Cole are the stockholders.

The Brazos Tile & Brick Company, which has been organized at Rosenberg, with a capital stock of $50,000, will establish a brick and tile manufacturing plant there. The incorporators are R. W. Knox, Jefferson N. Miller, J. M. Dorance of Houston and others.

The Board of Trade of Port Arthur is promoting the establishment there of a lumber mill. The company that is to be organized for the purpose of carrying out the project will have a capital stock of $100,000.

E. A. Laughlin is promoting the erection at Port Arthur of storage warehouses and the installation of machinery to load and unload lumber and other commodities from cars and ships.

It is reported that the American Sugar Refining Company contemplates installing a large sugar refinery at some point in south Texas. The proposed plant will probably be located, it is stated, in the lower Rio Grande Valley. T. S. Witherspoon of New York, a representative of the company, has been investigating the situation.

The El Paso Gas & Electric Company, which has taken over the franchise granted by the city of El Paso to C. H. Bosworth for the installation of a gas manufacturing plant there and construction of a distributing system, will soon begin the work of carrying out its plans for the proposed improvement, it is stated.

The International Electric Company, which was recently organized at Eagle Pass, with a capital stock of $160,000, will install an electric power and lighting plant and operate in Eagle Pass and Piedras Negras, Mexico, situated on the other side of the Rio Grande from Eagle Pass. The incorporators of the company are W. H. Painter, Charles H. Hubbell, D. G. Fisher, H. I. Gahagan and A. D. Richardson.

The Eagle Pass Water Company, which has a capital stock of $60,000, will install a waterworks plant and distributing system at Eagle Pass. Among those interested are J. B. Oliger, W. L. Davis and J. D. Crawford.

The Rio Grande Canal Company, which has been organized at Brownsville, with a capital stock of $50,000, will construct a system of irrigation and install a large pumping plant near there. The incorporators are L. C.

Hill, Sr., L. C. Hill, Jr., of Harlingen; J. B. Scott, R. B. Rentfro and Saunders Gregg, all of Brownsville. The same stockholders have also organized the Fresno Land & Irrigation Company, with a capital stock of $50,000 for the purpose of constructing another large system of irrigation in the same section.

The De Leon Peanut Company will install a plant at De Leon for the manufacture of peanuts into various food products. The incorporators are R. W. Higginbothan, A. E. Hampton and W. E. Lowe.

The Sanitary Water Company will install a waterworks plant at Cooper.

The Peoples Cotton Oil Mill Company is rebuilding its oil mill at Sulphur Springs, at a cost of $75,000.

The Corpus Christi Street Railway & Interurban Company, which was recently granted a franchise by the City Council, is installing a power plant at Corpus Christi.

The Victoria Syrup & Coffee Company has let the contract for the erection of its factory at Victoria to the Bailey Mills Company.

The Kelvin-Sultana Mining Company will install a large electric power plant at Kelvin, Ariz., for the purpose of providing power for operating the machinery at its mines.

The West Bank Mill Company, West Bank, has been organized with a capital stock of $30,000. W. P. Wilson, J. J. Gray of Dallas, R. W. Sloan, G. E. Cutler of Salt Lake City, Utah, are the stockholders.

The San Marcos Gravel Company will install machinery near San Marcos, for operating its gravel beds. C. L. Hopkins is interested.

The installation of a waterworks plant and laying of a distributing system for Puebla, Mexico, by the Municipal and State Governments will soon be started. The Federal Government has granted permission to import free of duty all iron pipe and machinery necessary for the works.

The Mexican Eagle Oil Company has purchased the site for a large oil refining plant which it proposes to erect at Tampico, Mexico. It is laying the foundations and will push the work to an early completion, it is announced.

The Pacific Coast

PORTLAND, ORE., November 19, 1912.

The placing of orders on large railroad lists has caused some appearance of activity of late, and the volume of business placed by coast concerns, though consisting only of single tools and small groups, is very satisfactory as compared with conditions a year ago. A good many tentative plans for improvement are under consideration, but definite inquiries are not much in evidence at the moment, the tendency being to hold off until the new year.

Continued activity in the lumber trade gives promise of a better movement of general machinery next year. Car builders have placed orders in the coast market for about 100,000,000 ft. of lumber, and the export business is extremely strong. While few inquiries are coming out at the moment for complete mill installations, the market for general mill and logging equipment, repair parts, etc., is extremely active, and increasing interest is shown in improved methods of handling logs and lumber. Several new logging companies are being formed, indicating prospects of an unusual amount of new timber development during the year. Plans are also under way for new hydro-electric development, as the market for electric power is rapidly growing, and the projects so far undertaken are barely a beginning.

The American Boiler & Iron Works, Everett, Wash., has been incorporated with a capital stock of $50,000, by H. Ramwell, A. Fife and others.

The Sectional Threshing Cylinder Company, Spokane, Wash., proposes to double the capacity of its plant at an estimated expenditure of $50,000.

The Oregon Electric Railway Company has let construction contracts for its car shops at Eugene, Ore.

The Phay machine shop, Grangeville, Idaho, was recently destroyed by fire. It is announced that it will be rebuilt next spring.

F. S. Harmon & Co., furniture manufacturers, have let contracts for a four-story factory building at Tacoma, Wash.

The Alaska Whaling Company plans to equip one of its sailing vessels with a marine engine during the winter.

The Marysville Gold Dredging Company is preparing to start work on a new dredge, equipped with 16-ft. buckets, at Marigold, Cal.

The city of Los Angeles has adopted an ordinance declaring the intention to sell the city's cement mill at Monolith, in Kern county, Cal.

Eastern Canada

TORONTO, ONT., November 16, 1912.

The fine autumn weather is proving very exhilarating for trade. It is true railroad construction has slackened on account of the cold in the northwestern part of the country, but the demand for outfit, and the demand on other manufacturing account that is thereby maintained shows no falling off. People keep swarming into the country and bringing money with them. In the seven months of the fiscal year beginning with last April 300,841 immigrants arrived in Canada. Of these 27,192 came in October. It is significant of much that whereas up to quite a recent time the immigration movement was confined largely to the spring and summer months, it is now almost discontinuous throughout the year. The people in Canada are all at work, with the exception of a small percentage of shiftless or disabled persons. There are no unemployed to speak of, and the manufacturers are urging the government to let in skilled workers on the same terms as agricultural workers, requiring no evidence of immediate means of support.

The National Hydroelectric Company, which has petitioned the Legislature of Quebec for authority to do business in Montreal and vicinity, has acquired a waterpower at Carillon Falls, which Henry Miles, the president, estimates as capable of developing 160,000 hp. The installation will cost, it is stated, about $10,000,000.

There is no intention of removing the Galt factory of Canadian Motors, Ltd., to Prince Albert, Sask., as is hinted in a dispatch from that place.

It is stated by the Mercury of Guelph, Ont., that the Stewart Sheaf Loader Company will start the construction of its plant in that city in the spring.

The announcement is made of the organization of the Ontario National Brick Company, Montreal, which has acquired land at Cooksville, close to Toronto, on which it will immediately commence the construction of a large modern brick plant. It will have a capital stock of $2,000,000. There will also be an authorized bond issue of $5,000,000, of which it is the intention to issue in the near future $1,000,000.

Arangements are proceeding for the establishing of a great sugar refinery at St. John, N. B., D. Lorne McGibbon and F. H. Anson of Montreal have been in conference with the City Council. The refinery will be a very large one on the water front with railway connection.

St. John, N. B., has expectations of getting a steel plant in which Norton Griffiths & Co., Ltd., and the Drummonds are interested. W. Burton Stewart, general manager for Norton Griffiths & Co., is in the city this week and says that the promoters of the steel plant hope to make a definite announcement within a few days.

The Union Bag & Paper Company, Cape de la Madeleine, Que., is about to build a factory.

The Galt Shoe Mfg. Company, Galt, Ont., will enlarge its factory if the ratepayers approve a by-law to aid the undertaking by a municipal loan.

The George White Company, manufacturer of threshing machines, etc., London, Ont., will erect new buildings and install machinery.

W. Henry, Chicago, is taking over the plant of the London Foundry Company, London, Ont., and will manufacture the Mitchell automobile there.

The Silversmiths, Ltd., will build a factory at New Hamburg, Ont., to cost $70,000.

The Archer Mfg. Company will erect a factory at Preston, Ont., if the ratepayers approve a municipal loan of $25,000 to assist.

The Cornwall & York Cotton Mills Company will extend its factory at St. John, N. B.

The General Chemical Products & Explosives Company will establish a plant at Three Rivers, Que.

The Canadian Porcelain Company, Ltd., has been incorporated with a capital stock of $300,000 to manufacture vitrified white porcelain for electrical and other purposes. It has purchased a 20-acre site in Hamilton, Ont., and will put up a plant, the first unit to cost $150,000. The buildings will be of steel and brick and will be ready for operation next spring. George Alden and Charles Palmer of Rochester and Frederick D. Palmer of Galt, Ont., are the principal directors.

Incorporation papers have been filed by Birmingham Brass, Ltd., with a capital stock of $40,000 to manufacture brass and iron goods. A foundry and factory will be equipped. Among the incorporators are Frederick Lee, Mahlon Diville Culbert and William Cartwright.

The Canadian Screw Company, Hamilton, Ont., J. Orr Callaghan, manager, will build an addition to its plant, 39 x 81 ft., three stories and basement, of brick and stone construction.

Western Canada

WINNIPEG, MAN., November 16, 1912.

There is a fairly good demand for machinery and parts, and the local houses report the volume of business much larger than at the corresponding time last year. Usually at this time of year many new business buildings are finished, and these have to be fitted with elevators and heating apparatus. In that respect this has been western Canada's busiest season. The industrial outlook continues very satisfactory, and the present indications are that many new plants will be added to this new country's manufactories next year. Also, the greater the industries expand in western Canada, the larger will become the demand for repairs remodeling and extension.

Felix Frank, general manager of the Great West Iron Wood & Chemical Company, who a short time ago negotiated an agreement with the Council of Prince Albert, Sask., for a free site and a guarantee of the company's bonds, has a new proposition before the city to locate a fertilizer and chemical manufacturing plant there, to employ 2000 men. Directors of the first-named company comprise D. B. Hanna, second vice-president of the Canadian Northern Railway, and Judge Phippen, chief counsel of Mackenzie & Mann.

The Regina Flour Mill Company, Ltd., Regina, Sask., has been organized to erect a 2000-barrel flour mill and a large elevator here.

Arrangements have been made by the Canadian Northern Railway with an eastern Canadian car company to establish car works at Port Mann, B. C., one of the Pacific terminals of the system. It is the company's intention to proceed immediately with the development of Port Mann. Col. A. D. Davidson, land commissioner and general western executive of the road, states that tenders will shortly be invited for the construction of machine shops, roundhouse, car repairing shops, storehouses, yards and material for the railroad.

Warren Overpack, formerly general manager of the Alberta Clay Products Company, Medicine Hat, has purchased the brick plant of Birnie Bros., in that city, for $150,000, and will practically double its capacity.

The people of Rosthern, Sask., are agitating for the installation of a water works system in that town.

The Crescent Creamery Company, Ltd., Winnipeg, is preparing to add to its manufacturing and cold storage facilities at a cost of about $200,000.

L. D. Shafner, of Bridgetown, Nova Scotia, is the president of a large company organized with a capital stock of $500,000 to establish a shipbuilding plant at Vancouver, B. C., with a view to constructing vessels to transport British Columbia lumber and timber via the Panama Canal. The name of the company is the Coquitlam Shipbuilding & Marine Railway Company.

The Barnet Lumber Company, Ltd., Vancouver, will build a 60,000 capacity sawmill near Hope, B. C., as soon as possible. The company own extensive limits at Silver Creek, B. C., the development of which has been held up owing to lack of railway transportation.

The Canadian Pacific Railway has announced that it will erect a grain elevator at Vancouver.

The Regina Storage & Drying Elevator Company, Ltd., has been incorporated with a capital stock of $1,000,000 for the purpose of erecting a storage and drying elevator at Regina, Sask.

The Canadian Wheel & Wagon Company has prepared plans for a factory at Fraser Mills, B. C.

The Nichols-Sheppard Company, implement manufacturer, Moose Jaw, Sask., will extend its factory at a cost of $80,000.

Robinson & Shrive, Sutherland, Sask., will erect a large planing mill at that place in the spring.

Government Purchases

WASHINGTON, D. C., November 18, 1912.

The Treasury Department, office of the supervising architect, Washington, will open bids December 12 for the installation, complete, of an electric passenger elevator at the United States post office at Florence, Ala.

The War Department, office of the chief signal officer, United States army, Washington, will open bids November 30 for furnishing, under proposal No. 622, one 2-kw. radio station equipment. The station is for installation on shipboard and includes a motor generator to operate at 110 volts, direct-current, the generator to give 500 cycles, single-phase alternating-current. The receiving set is to be the Wireless Specialty Company's type, 1-P-76.

The Mississippi River Commission, Liggett Building, St. Louis, Mo., will open bids December 7 for the construction and delivery of one twin-screw steamboat, 144 ft. in length and 26 ft. beam.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids November 12 for materials and supplies for the navy yards as follows:

Schedule 4879, class 1, two engine lathes for delivery to Mare Island: Bidder 48, Compressed Air & General Machinery Company, San Francisco, Cal., $1,011 and $892; 86, Harron, Ricard & McCone, San Francisco, Cal., $976; 129, Niles-Bement-Pond Company, New York, $983; 145, Pacific Tool & Supply Company, San Francisco, Cal., $1,120; 154 Rix Compressed Air & Drill Company, San Francisco, Cal., $996 and $938, alternate; 174, Springfield Machine Tool Company, Springfield, Ohio, $936.

Schedule 4901, class 31, one molding machine for delivery to Mare Island: Bidder 137, S. Obermayer Company, Chicago, Ill., $672; 209, E. J. Woodison Company, Detroit, Mich, informal.

Trade Publications

Stokers.—American Engineering Company, Philadelphia, Pa. Pamphlet. Gives facts concerning the operation of Taylor stokers which have been obtained from users by the builders. The pamphlet consists entirely of reports of tests made on these stokers in various plants together with reproductions of a number of curves. A partial list of representative installations of the stokers completes the pamplet.

Variable-Speed Engines.—American Engine Company, Bound Brook, N. J. Pamphlet. Calls attention to a four-cylinder variable-speed engine, a two-cylinder engine which is built in both the angle and double horizontal types and a single-cylinder constant-speed engine. A partial list of users of these engines is included.

Fuel Economizers.—Green Fuel Economizer Company, Matteawan, N. Y. Pamphlet entitled "Best Proportions of Boiler and Economizer Surface." Discusses the tendency toward the adoption of the countercurrent or multi-stage principle in steam generation and develops a method for determining the proper limits of boiler and economizer surface. It is pointed out that the economizer surface transmits two or three times as much heat as the same amount of additional boiler surface at the same point in the travel in the gases could because of the greater temperature head available between the hot gases and feed water as compared with that between the gases and the steam, the result being greater steam making efficiency at lower cost. A large portion of the material contained in this pamphlet appeared in *The Iron Age*, September 26, 1912.

Crane Wheels.—Edgar Allen American Manganese Steel Company, McCormick Building, Chicago, Ill. Bulletin No. 53. Treats of a line of crane wheels made from Stag brand manganese steel. The special advantages claimed for this type of wheel are practical freedom from flange wear and the absolute elimination of breakage. The wheels are illustrated and there is a diagram showing the dimensions required when orders are placed. Mention is also made of a wheel for use with ore unloading machines.

Steam Turbines.—De Laval Steam Turbine Company, Trenton, N. J. Catalogue. Describes a velocity-stage type of steam turbine having a single pressure stage which is built in sizes up to 600 hp. It is suitable for a direct connection to centrifugal pumps, blowers and small electric generators, etc., or for use with an intermediate gear and can be adapted to drive slow and standard speed machinery and for use with rope or belt drives. The catalogue is profusely illustrated with halftone engravings of various parts of the turbine as well as installation views. An illustrated description of this turbine which is known the class C machine appeared in *The Iron Age*, August 22, 1912.

Copper Clad Steel Products.—Duplex Metals Company, Chester, Pa. Booklet. Deals with the process of manufacture and uses of several copper clad steel products, considerable space being devoted to the copper clad wire for telephone service. The metallurgy of these products is gone into in some length and there are a number of tables of useful information. An illustrated description of the plant in which these products are made and the process of manufacture appeared in *The Iron Age*, September 12, 1912.

Cost Records.—Calculagraph Company, 9 Maiden lane, New York City. Pamphlet entitled "Elapsed Time by Elimination." Discusses the advantages of the Calculagraph for the making of cost records. This is done by giving a comparative example of the use of an elimination type of recorder and a Calculagraph for this purpose.

Forced Draft.—American Blower Company, Detroit, Mich. Pamphlet No. 349. Concerned with the use of Sirocco forced draft outfits on the recently constructed large battleships of the United States Navy. Views are given of four of the vessels as well as portions of the equipment and there is a brief account of the speed records made by these vessels.

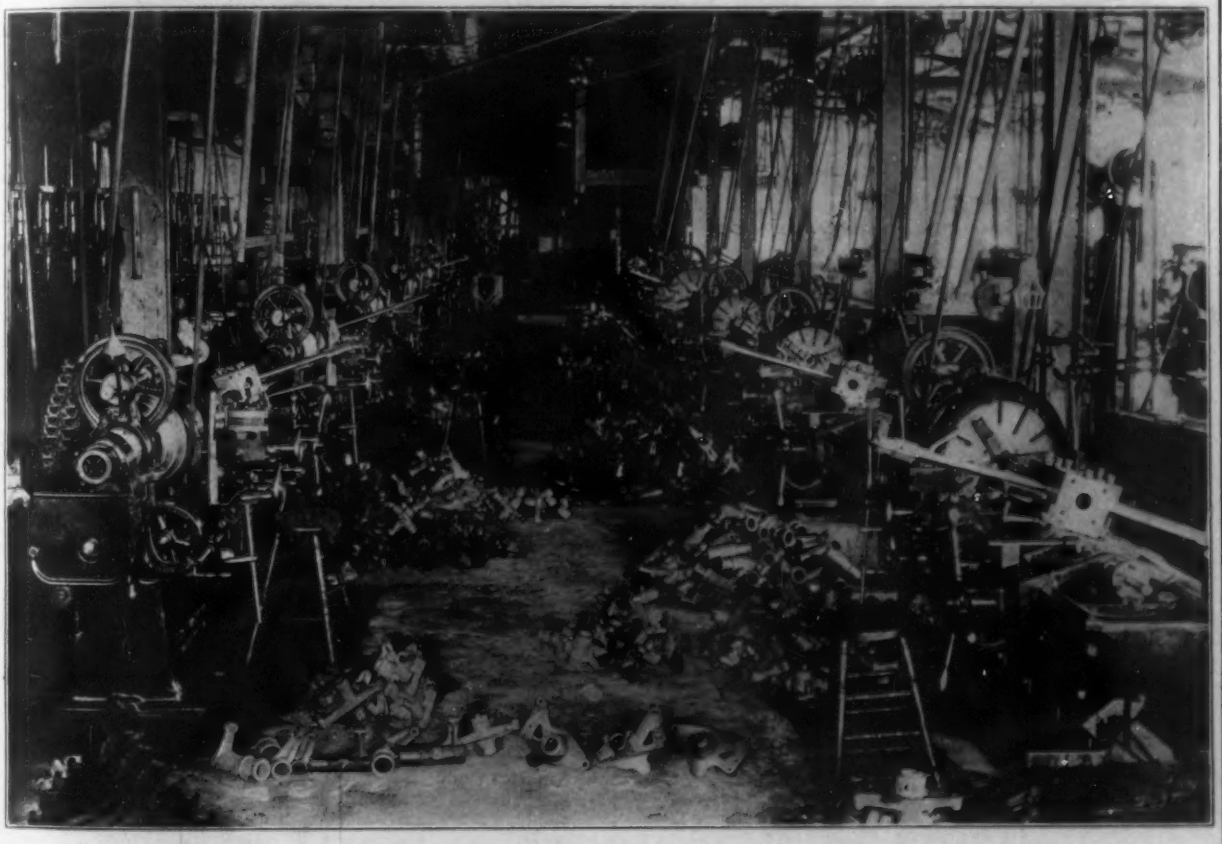
REPEAT ORDERS

The accompanying illustration shows

Gisholt Turret Lathes

finishing **Rear Axle Parts** in a leading **Automobile Plant.** These manufacturers ordered their first Gisholt in 1910; their second July 7, 1911; their third July 28, 1911; their fourth January 1, 1912. On February 13, 1912, they followed with an additional order of six Gisholt Turret Lathes. August 10, 1912, their battery was further reinforced by the purchase of two more Gisholts. And still more are being made ready for shipment, attesting to the **continuous result-bringing power of Gisholt Machines.**

NOTE: **Some striking figures showing output increased by the use of Gisholt Machines in Automobile Plants are available to those genuinely interested.**



Not only do

GISHOLT MACHINES

"Stand Up" but the **Gisholt Organization Stands Back** of the manufacturer who desires **co-operation.** This is an exceedingly real service and is of vital moment to all manufacturers who have problems to solve involving **Boring, Turning** and **Facing.**

The net of the matter is this: One of our Production Engineers is ready to come to your plant, without expense to you, to investigate your shop conditions and give you the benefit of our experience. Whether the interview means a sale or not, you profit.

GISHOLT MACHINE COMPANY

Manufacturers of Turret Lathes, Boring Mills and other Labor Saving Machines

MADISON, WISCONSIN

New York Office: 50 Church Street

FOREIGN AGENTS: Alfred H. Schütte, Cologne, Berlin, Brussels, Bilbao, Barcelona; Donauwerk Ernst Krause & Co., Vienna, Prague and Budapest; C. W. Burton Griffiths & Co., London, England; Andrews & George, Yokohama, Japan.

Current Metal Prices

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impracticable to name every size.

The wholesale prices, at which large lots are sold by manufacturers for direct shipment from mills, are given in the market reports appearing in a preceding part of *The Iron Age* under the general heading of "The Iron and Metal Markets."

IRON AND STEEL

Bar Iron and Soft Steel Bars

	Per lb.
Refined iron:	
1 to 1⅞ in., round and square	2.00c
1½ to 4 in. x ⅜ to 1 in.	2.00c
1½ to 4 in. x ¼ to 5/16 in.	2.20c
Burden's H. B. & S. bar iron, base price	3.32c
Burden's Best bar iron, base price	3.35c
Norway bars	3.00c
Soft steel:	
¾ to 3 in., round and square	2.00c
1 to 6 in. x ⅜ to 1 in.	2.00c
1 to 6 in. x ¼ and 5/16 in.	2.15c
Rods—⅝ and 11/16 in.	2.10c
Bands—1½ to 6 x 3/16 to No. 8	2.30c

Shapes

Beams and channels—3 to 15 in.	2.15c
Angles:	
3 in. x ¼ in. and larger	2.15c
3 in. x 3/16 in. and ⅛ in.	2.50c
1½ to 2½ in. x ⅛ in.	2.25c
1½ to 2¾ in. x 3/16 in. and thicker	2.15c
1 to 1¼ in. x 3/16 in.	2.25c
1 to 1¼ x ⅛ in.	2.30c
⅞ x ⅛ in.	2.40c
¾ x ⅛ in.	2.45c
⅝ x ⅛ in.	3.65c
½ x 3/32 in.	4.70c
Tees:	
1 in. x 1 x ⅛ in.	2.55c
1¼ in. x 1¼ in. x 3/16 in.	2.40c
1½ to 2½ x ¼ in.	2.20c
1½ to 2½ x 3/16 in.	2.30c
3 in. and larger	2.20c

Merchant Steel

Bessemer machinery	2.00c
Tire, toe calk, and sleigh shoe	1.90@3.00c
Best cast steel, base price in small lots	7c

Sheets

	Black. One pass, C. R. soft steel.	R. G. cleaned.
No. 14	Per lb. 2.65c	2.95c
No. 16	Per lb. 2.75c	3.05c
Nos. 18 to 20	Per lb. 2.80c	3.25c
Nos. 22 and 24	Per lb. 2.85c	3.35c
No. 26	Per lb. 2.90c	3.45c
No. 27	Per lb. 2.95c	3.55c
No. 28	Per lb. 3.00c	3.65c
No. 29	Per lb. 3.20c	——
No. 30	Per lb. 3.40c	——

Russia, Planished, &c.

Genuine Russia, according to assortment..Per lb. 12@14½c
Patent planished, W. Dewees Wood..Per lb. A. 10c; B. 9c net

Galvanized.

Nos. 12 and 14	Per lb. 3.25c
No. 16	Per lb. 3.35c
Nos. 18 and 20	Per lb. 3.50c
Nos. 22 and 24	Per lb. 3.65c
No. 26	Per lb. 3.80c
No. 27	Per lb. 3.95c
No. 28	Per lb. 4.10c
No. 30	Per lb. 4.50c

No. 20 and lighter, 36 inches wide, 10c higher.

Corrugated Roofing, Galvanized

2½ in. corrugations, 10c per 100 lb. over flat sheets.

Corrugated Roofing, Painted

2½ in. corrugation.

No. 22	Per 100 sq. ft..$4.75
No. 24	Per 100 sq. ft.. 3.75
No. 26	Per 100 sq. ft.. 2.85
No. 28	Per 100 sq. ft.. 2.50

Genuine Iron Sheets

Galvanized.

Nos. 22 and 24	Per lb. 5.75c
No. 26	Per lb. 6.50c
No. 28	Per lb. 7.25c

Tin Plates

American Charcoal Plates

AAA charcoal:	
IC 14 x 20	$6.55
IX 14 x 20	7.80
A charcoal:	
IC 14 x 20	$5.50
IX 14 x 20	6.00

American Coke Plates—Bessemer.

IC 14 x 20, 107 lb.	$4.40
IX 14 x 20	5.40

American Terne Plates. Per box

IC 20 x 28 with an 8-lb. coating	$8.50
IX 20 x 28 with an 8-lb. coating	10.50

Seamless Brass Tubes

List November 13, 1908. Base price, 22c

Brass Tubes, Iron Pipe Sizes

List November 13, 1908. Base price, 22c

Copper Tubes

List February 1, 1911. Base price, 26c

Brazed Brass Tubes

List February 1, 1911. Base price, 23¼c

High Brass Rods

List February 1, 1911. Base price, 18⅜c

Roll and Sheet Brass

List February 1, 1911. Base price, 18⅝c

Brass Wire

List March 30, 1911. Base price, 18⅜c

Copper Wire

Base price Carload lots mill, 19¼c

Copper Sheets

Sheet copper hot rolled, 16 oz. (quantity lots), Base price, per lb., 23c.

Sheet copper cold rolled, 14 oz. and heavier, 1c per. lb. advance over hot rolled.

Sheet copper polished, 20 in. wide and under, 1c per sq. ft.

Sheet copper polished, over 20 in. wide, 2c per sq. ft.

Planished copper, 1c per sq. ft. more than polished.

Tinning, one side, 3½c per sq. ft.

METALS

Tin

Straits pig	Per lb. 52 @53 c

Copper

Lake ingot	Per lb. 19¼@19¾c
Electrolytic	Per lb. 19 @19½c
Casting	Per lb. 18¾@19¼c

Spelter

Western	Per lb. 8½@ 8¾c

Zinc

No. 9 base, casks.....Per lb. 9.50c Open....Per lb. 10c

Lead

American pig	Per lb. 5½@6 c
Bar	Per lb. 7 @7½c

Solder

½ & ½, guaranteed	Per lb. 31½@32 c
No. 1	Per lb. 29 @29½c
Refined	Per lb. 26½@27 c

Prices of solder indicated by private brand vary according to composition.

Antimony

Cookson's	Per lb. 11¼c
Hallett's	Per lb. 11 c
Other brands	Per lb. 10½@11 c

Bismuth

Per lb.	$2.00@$2.25

Aluminum

No. 1 aluminum (guaranteed over 99 per cent. pure), in ingots for remelting (ton lots)..f.o.b mill, 27.50@28.00c
In 100 lb. lots....31@32c

Old Metals

Dealers' purchasing prices paid in New York are as follows:

	Cents per lb.
Copper, heavy and crucible	15.75
Copper, heavy and wire	15.25
Copper, light and bottoms	13.75
Brass, heavy	9.50
Brass, light	7.75
Heavy machine composition	13.00
Clean brass turnings	9.00
Composition turnings	11.50
Lead, heavy	4.25
Lead, tea	4.00
Zinc, scrap	6.00

Satisfaction

Nearly half a century ago the NICHOLSON FILE COMPANY began making files with the belief that a very superior quality would bring them a great number of satisfied customers.

Thousands of dozens of files distributed annually to pleased users, speak for the success of this policy.

Leading dealers in almost every town can sell you genuine NICHOLSON brand files. If *your* dealer cannot supply you, write us, and we will see that you get them.

Nicholson File Co., Providence, R. I.

Mill and Machinists' Supplies

These prices are for small lots and are obtained from dealers

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers

Special Goods.—Quotations printed in Roman relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price $2, prepaid, contains the list prices of many leading goods.

ANVILS—AMERICAN—

Eagle Anvils ..... ℔ lb @9 ¢
Hay-Budden, Wrought ..... 9½@9¾¢
Star ..... ℔ doz. $13.80
Trenton ..... ℔ lb 9½@9¾¢

Imported—

Swedish Solid Steel Paragon, ℔ lb....9½@9¾¢
Peter Wright & Sons, ℔ lb, 80 to 349 lb, 10½¢
350 to 600 lb, 11¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

AXLES—

Iron and Steel—

Concord, Loose Collar.....4¼@4½¢
Concord, Solid Collar.....4½&5 ¢
No. 1 Common, Loose.....3½@4 ¢
No. 1½ Com., New Style.....4¼@4¾¢
No. 2, Solid Collar.....4¼@4¾¢
Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18.....70&10@70&10&5%
Nos. 19 to 22.....70&10@70&10&5%

Boxes, Axle—

Common and Concord, not turned..lb.,5@6¢
Common and Concord, turned.....lb.,6@7¢
Half Patent .....lb.,9½@10¢

BARS—CROW—

Steel Crowbars, 10 to 40 lb., per lb.....2¾¢

BELLOWS—

Blacksmith, Standard List:
Split Leather.....60%
Grain Leather .....40@40&10%

Hand—

Inch	6	7	8	10
Doz.	$4.00	5.50	6.50	7.00

Molders—

Inch	10	12	14	16
Doz.	6.75	9.00	11.50	16.50

Net Prices.

BELTING—LEATHER—

From No. 1 Oak Tan Butts

Extra Heavy, Single and Double....50@50&5%
Heavy, Single and Double.....50&10&5@60%
Medium, Single and Double..60&10@60&10&5%
Shoulder, Single and Double.....70@70&10%
Standard .....60&10@60&10&5%
Cut Leather Lacing, Strictly No. 1....40@50%
Leather Lacing Sides, per sq. ft. Raw Hide.
No. 1, in sides 17 sq. ft. and over....26@27¢
Under 17 sq. ft.....24@25¢

Rubber—

Competition (Low Grade).....70&5@70&10%
Standard .....60&10@60&10&10%
Best Grades .....40&10@50%

BENDERS AND UPSETTERS, TIRE—

Green River Tire Benders and Upsetters....20%

BLOCKS—TACKLE—

Common Wooden .....75&5%
Lane's Patent Automatic Lock and Junior..30%
See also Machines, Hoisting.

BOLTS—

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅜ x 6 and smaller.....75&10%
Larger and longer.....70&10%
Common Carriage (rolled thread):
⅜ x 6, smaller and shorter.....75&5&2½%
Phila. Eagle, $3.00 list.....80&10%
Bolt Ends, with C. & T. Nuts.....70%
Machine (cut thread):
⅜ x 4 and smaller.....75%
Larger and longer.....70%

Expansion—

F. H. Evans' Crescent.....40@60%
Richards-Wilcox Mfg. Co.....60&10%
A. C. Seaman's Positive .....60&10%
Star Expansion Bolt Co.:
Star Lag Screw Type.....50&10&10%
Star, and Sebco, Wood Screw Type.....50%
Star Machine, Single .....50&10%
Star Machine, Double .....50&10%
Sebco Toggle Bolts .....50&10%
Steward & Romaine Mfg. Co.:
Style No. 13 Double Machine.....70%
Style No. 1, Single Machine.....70%
Style No. 100, Double Jaw, Single.....60%
Lag Screw Type.....66⅔%
Screw Anchors 60%

Tire—

Common Iron .....80@80&10%
Norway Iron 80%
American Screw Co.:
Norway Phil., list Oct., '84.....80%
Eagle Phil., list Oct. 16, '84.....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phil., list Oct. 16, '84.....80%
Eagle Phil., list Oct. 16, '84.....82½%
Eclipse, list Dec. 28, '99. .....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phil., list Oct., '84.....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phil., Eagle, list Oct. 16, '84.....82½%
Upson Nut Co.:
Tire Bolts .....75&10&5%

CALKS, TOE AND HEEL—

Blunt, 1 prong, per 100 lb.....$3.80@$4.00
Sharp, 1 prong, per 100 lb.....$4.30@$4 50
Perkins', Blunt, ℔ lb., 3.65¢; Sharp....4.25¢

CHAIN, PROOF COIL—

Small lots, New York.

American Coil Straight Link—

3-16	¼	5-16	⅜	7-16	½&9-16	⅝	¾	⅞
$7.85	5.30	4.30	3.75	3.55	3.40	3.25	3.15	3.05

1 to 1¼ 2.95

Genuine German Coil.....65&10%
American, German Pattern Coil:
6/0 to 2/0.....80%
1/0 .....75@75&10%
1, 2, 3.....70@75%
4 .....65&10@70%
5, 6 .....60&10@65%

Trace, Wagon, &c.—

Traces, Western Standard: *100 pr.*
6½—6-3, Straight, wish ring.....$26.00
6½—6-2, Straight, with ring.....$27.00
6½—8-2, Straight, with ring.....$32.00
6½—10-2, Straight, with ring.....$38.00
NOTE.—Add 2¢ per pair for Hooks Twist Traces add per pair for Nos. 2 and 3, 2¢; No. 1, 3¢; No. 0, 4¢ to price of Straight Link. Eastern Standard Traces, Wagon Chain, &c. .....70&10@—%

Miscellaneous—

Jack Chain:
Iron .....50&10%
Brass 50%
Safety and Plumbers' Chain..70&10@70&10&5%

CHESTS, TOOL—

American Tool Chest Co.:
Farmers', Carpenters', etc., Chests with Tools 20%
Tool Cabinets, with Tools.....45%
Machinists' and Pipe Fitters' Chests, Empty 45%
Steel Tool Chests, Empty.....20%
C. E. Jennings & Co.'s Machinists' Tool Chests 20%

CHISELS—

Cold—

Cold Chisels, good quality.....13@15¢
Cold Chisels, fair quality.....11@12¢
Cold Chisels, ordinary.....9@10¢

CHUCKS—

Almond Drill Chucks.....35%
Beach Pat. each $8.00.....35&5%
Jacobs' Drill Chucks.....30%
Skinner Lathe Chucks:
Independent 35%
Universal, Reversible Jaws.....35%
Universal, Com. Style Jaws.....40%
Combination, Reversible Jaws.....35%
Combination, Com. Style Jaws.....40%
Round Body or Box Body, 2 Jaw Chuck..25%
Geared Scroll Chucks.....35%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%
Positive Drive 35%
Planer Chucks 20%
Standard 45%
Drill Press Vise.....30%
Face Plate Jaws.....35%
Standard Tool Co.:
Improved Drill Chuck.....40%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; Nos. 21 and 24.....35%
Scroll Combination, Nos. 83 and 84....30%
Geared Scroll, Nos. 79, 80 and 81.....25%
Independent Iron, Nos. 118, 19, 318 and 96.35%
Independent Steel, No. 64.....25%
Union Drill 30%
Union Czar Drill.....30%
Universal, Nos. 21 and 42.....35%
Iron Face Plate Jaws, Nos. 48 and 50...35%
Steel Face Plate Jaws, Nos. 70 and 72..30%
Westcott Patent Chucks:
Lathe Chucks 40%
Little Giant Auxiliary Drill.....40%
Little Giant Double Grip Drill.....40%
Little Giant Drill, Improved.....40%
Oneida Drill 40%
Scroll Combination Lathe 40%

CLAMPS—

Hammer & Co.:
Adjustable .....20&5%
Carriage Makers' H. P. Screw.....40&5%
Myers', Standard and Wenzelmann Hay Rack. 50%
J. H. Williams & Co.:
Machinists, Agrippa .....40&10%
Machinists, Vulcan .....40&10%

CLIPS, AXLE—

Regular Styles.....80@80&10%

COMPASSES, DIVIDERS, &c.—

Ordinary Goods.....75&5@80%

COPPERS, SOLDERING—

Soldering Coppers, 3 lb. to pair and heavier, 25&2%
Lighter than 3 lb., per pair.....27&2%

CRAYONS—

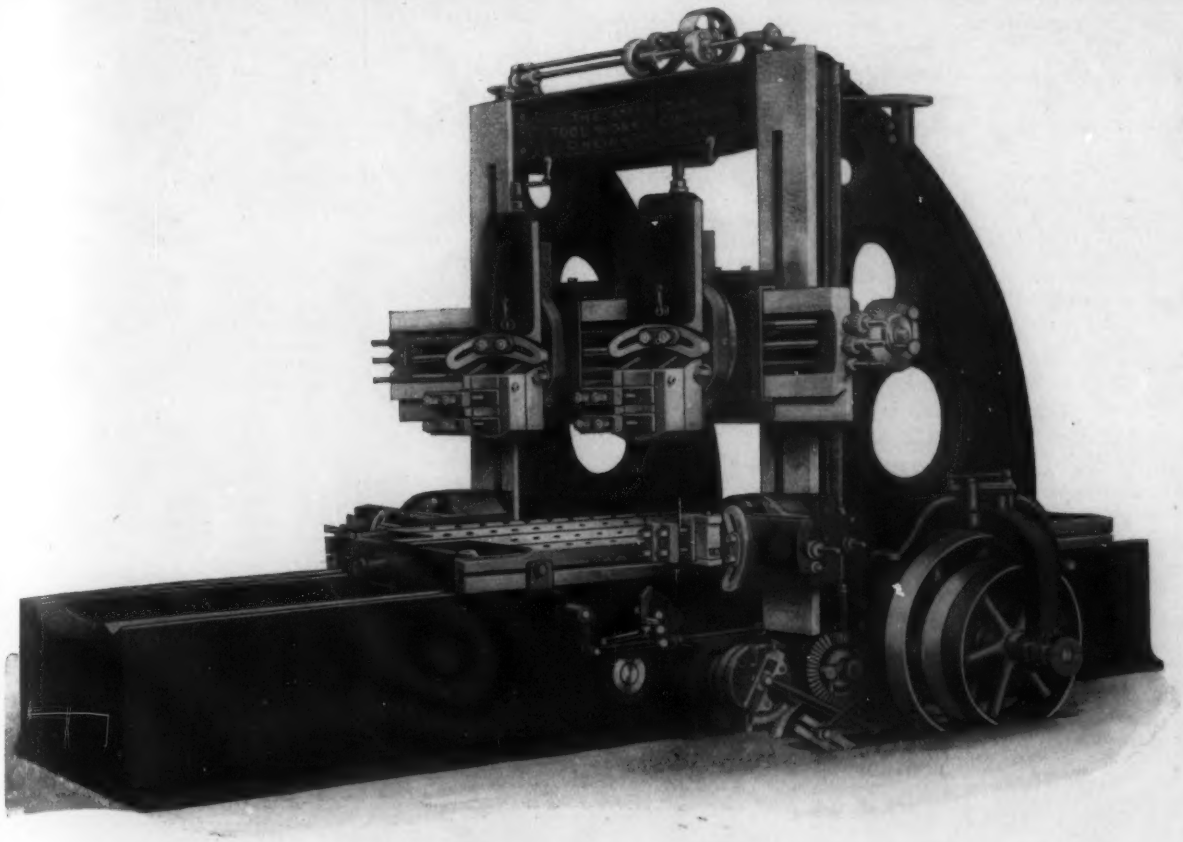
White Round Crayons, Case1, 100 gro., $8.00, $8.50, $9.00 and $10.00, according to grade.
Zeinicker's Lumber: ℔ gro.
White and Purple, Indelible.....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black $4.50
Giant Lumber, 5¼ in. x 15/16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks $10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.00; 5 in. x ¼ in. Square, $1.50; 5 x ½ x 3/16, $1.75; 5 x 1¼ x 3/16.....$2.50
Suremark, Black, $2.25; Blue, Red and Yellow $2.50

DRESSERS, EMERY WHEEL—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutter.....35%

DRILLS AND DRILL STOCKS—

Blacksmith's Common Drilling Machines..$175
Breast, Millers Falls.....15&10%
C. & C. Reversible Ratchet Die Stocks....25%
Forbes Die Stocks.....5%
Goodell Automatic Drills.....50&10@60&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.80; 2.....$8.10
Millers Falls Automatic Drills ℔ doz., Nos. 3 & 5, $8.10; 4 & 7, $9.30; 6.....$9.90
Noyes Repair Shop Drill No. 10..... 20%
Ratchet, Parker's..... 10%
Star Drills and Fascut 60%



60 x 60-inch Metal Planer

Accurate Alignments

Are especially desirable in a planer, because this type of machine more nearly reproduces the class of workmanship inherent in itself than any other machine tool. Furthermore, in machine construction planed surfaces form the foundation from which all other parts are fitted and aligned; therefore a good accurate job of planing at the start will save much time and consequent expense in fitting and scraping on your erecting floor.

"American" Planers Are Accurate

and possess the necessary stability to retain their alignments.

These Planers are fully guaranteed to plane perfectly square and parallel up to their maximum capacity within .001 part of an inch.

Write for Our Efficiency Bulletin

THE AMERICAN TOOL WORKS COMPANY

CINCINNATI, U. S. A.

LATHES PLANERS SHAPERS RADIAL DRILLS

Star Drill Holders.....70%
Star Drill Points.....60&10%

Twist Drills—

Bit Stock.....70&5@70&10%
Taper and Straight Shank....65&10@65&10&5%

EMERY, TURKISH—

		4 to 46:	54 to 220:	Flour.
Kegs	lb.	5 ¢	5½¢	3½¢
½ Kegs	lb.	5¼¢	5¾¢	3¾¢
¼ Kegs	lb.	5½¢	6 ¢	4 ¢
10-lb. cans, 10 in case		6½¢	7 ¢	6 ¢
10-lb. cans; less than 10		10 ¢	10 ¢	8 ¢
Less quantity		10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 5 tons a discount of 10% is given.

FILES—

Domestic—

Best Brands.....70&10@70&10&10%
Standard Brands.....80&5@80&10&5%
Lower Grade.....80&5@80&10%
American.....75&10%
Arcade.....75&10%
Black Diamond.....70&10%
Delta Brand.....70%
Disston's Superfine.....50%
Eagle.....75&10%
Fitchburg.....75&10%
Great Western.....75&10%
Heller Bros.....70&10@70&10&10%
Kearney & Foot.....75&10%
Liveright Bros. Gold Medal.....70%
Liveright Bros. Blue Ribbon.....70%
McClellan.....75&10%
Nicholson.....70&10%
Simonds.....70%
J. Barton Smith.....75&10%
Toolmakers' "American Swiss".....40&10%
X-F Swiss Pattern.....40&10%

FIXTURES, FIRE DOOR—

Richards-Wilcox Mfg. Co.:
No. 102, Monarch A; No. 201, Mutual.50&10%
Universal, No. 103; Special, No. 104.....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—

Net Prices:

Inch	15	17	19	21
Per doz	$3.00	3.25	3.55	4.00

Reading Hardware Co.....50&10%

GASKETS—

Akron Metallic Gasket Co.:
Corrugated Copper.....75@5%

GAUGES—

Marking, Mortise, &c.....50@50@10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50@50&10%
Disston's Marking, Mortise, &c.....60&10%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....35%

GRINDERS—

Luther Grinder Mfg. Co.:
Dimo-Grit: each
No. 44 (Fire Fly, No. 4).....$1.05
No. 44½ (Fire Fly, No. 6).....$1.40
No. 14 (Mechanic Special, No. 4M)...$1.40
No. 15 (Mechanic Special, No. 5M)...$2.10
No. 16 (Mechanic Special, No. 6M)...$3.15
No. 17 (Mechanic Special, No. 7M)...$4.00
No. 18 (Mechanic Special, No. 8).....$4.50
No. 18X (Mechanic Special, No. 8X)..$5.00
No. 19 (Mechanic Special, No. 11)....$7.50
No. 55 (Best Maide, No. 1).....$3.05
No. 63 (Farm Special, No. 3).....$6.40
No. 83 (Spartan).....$2.85
No. 271 (New Hummer).....$9.00
Pike Mfg. Co.:
Enclosed Gear Machines: Peerless Senior, Junior and Midget.....33⅓%
Chain Driven Machines: Nos. 1, 2, 3 and Pyko Field Grinder 33⅓; Pyko Spiral (Foot Power).....33⅓%
Redlinger & Angle Mfg. Co.:
Climax Steel Frame Emery Grinder, No.5, $7.00
Star Wooden Frame Emery Grinder.....$5.00

GRINDSTONES—

Pike Mfg. Co.:
Improved Family Grindstones, ℔ inch, ℔ doz., $2.00.....33⅓%
Richards-Wilcox Mfg. Co., Victor, Cycle, King, Velox, Challenge, Climax, Ell Nos. 011, 014, Ball Bearing, mounted.....30%

HAMMERS—

Heavy Hammers and Sledges—

6 to 5 lb. 40.....75&10&5@80&10%
Over 5 lb., 30.....80&10@80&10&10%

JACKS—

Wagon—

Lanes' Steel.....30&5%
Richards-Wilcox Mfg. Co.:
Richards' Tiger Steel, No. 130.....50&10%
Wilcox Steel No. 228—1, $5.75; 2, $7.00; 3, $12.85; 4, $28.50.

MACHINES—

Boring—

Com. Upr't without Augers.....$2.00@2.25
Com. Angl'r without Augers.....$2.25@2.50
Ford Auger Bit Co.....$20.00
Jennings', Nos. 1 and 4.....25%
Millers Falls.....15&10%
Swan's Improved.....40&10%

Forming, Bending, &c.

Royal Forming, Bending, Crimping and Fluting, Hand Power, each, $15.00.....40%

Hoisting—

Moore's Anti-Friction Chain Hoist.....30%
Moore's Cyclone High Speed Chain Hoist...25%

NAILS—

Wire Nails and Brads, Miscellaneous.....85&10&5%

Cut and Wire. See Trade Report.

Horse—

Jobbers' Special Brands.....*per lb., 8@9¼¢*

NUTS—

Blank or Tapped—

Cold Punched: *Off list.*
Square.....5.0¢
Hexagon.....5.4¢
Square, C. T. & R......5.6¢
Hexagon, C. T. & R......6.5¢
Hot Pressed:.....*Off list.*
Square.....5.6¢
Hexagon.....6.2¢

OAKUM—

In 50-lb. Bales.
Best.....lb., 6¢
U. S. Navy.....lb., 5½¢
Navy.....lb., 4½¢
Plumbers' Spun Oakum.....lb., 2¼¢

OILERS—

Steel, Copper Plated.....80%
Chase or Paragon:
Brass and Copper.....45@50%
Zinc.....70%
Railroad.....60&10&10%
American Tube & Stamping Co.:
Spring Botom Cans.....75&5@80%
Railroad Oilers, &c.....70@70&10%
Hero Mfg. Co.:
Spring Bottom Cans.....75&5@80%
Railroad Oilers, &c.....60@60&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4.50%

OILS—

Animal, Fish and Vegetable—

Linseed, raw, carload lots.....52¢
City, five-bbl. lots and over.....53¢
Out-of-town, five-bbl. lots and over.....52¢
Boiled, 1¢ ℔ gal. advance on Raw.
Lard, Prime Winter.....78 @85
Extra No. 1.....60 @65
No. 1.....56 @58
Cotton-seed, Crude, f.o.b. mill.....36½@37½
Summer, Yellow, prime.....5¾@ 5⅞
Summer, white.....6¼@ 6½
Yellow, Winter.....6½@ 6¾
Tallow, Acidless.....65
Menhaden, Brown, Strained.....33 @34
Northern Crude.....29 @30
Southern, f.o.b. Baltimore.....28 @29
Light, Strained.....34 @35
Bleached, Yellow.....36 @37
Bleached, Winter, White.....38 @39
Cocoanut, Ceylon, spot.....9¼@ 9⅜
Copra, spot.....9⅛@ 9¼
Cochin, spot.....10¾@11
Cod, Domestic, Prime.....41 @42
Newfoundland.....43 @44
Corn.....5.55@5.60
Porpoise, body.....50 @60
Olive, in bond.....88 @92
Neatsfoot, Prime.....62 @65
Palm Lagos.....*spot, per lb.* 7¼@ 7½
Soya Bean, English, spot bbls..... 6⅜@ 6⅝

Mineral Oils—

℔ gal.
Black, 29 gravity, 25@30 cold test..13½@14
29 gravity, 15 cold test.....14 @14½
Summer.....11½@12
Cylinder, light filtered.....21½@33
Dark, filtered.....18 @26
Paraffine, 903-907 sp. gravity.....15 @15½
903 sp. gravity.....14 @14½
885 sp. gravity.....12 @12½
Red Paraffine.....14 @16

PACKING—

Asbestos Packing, Wick and Rope, any quantity.....14@16¢

Rubber—

(Fair quality goods.)
Sheet, C. I......11@12¢
Sheet, C. O. S......11@12¢
Sheet, C. B. S......12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢

Miscellaneous—

American Packing.....lb. 8½@ 9 ¢
Cotton Packing.....lb. 16 @25 ¢
Italian Packing.....lb. 9 @10 ¢
Jute.....lb. 3¼@ 3½¢
Russia Packing.....lb. 9 @10 ¢

PICKS AND MATTOCKS—

List.....75&10@80%

PIPE, VITRIFIED SEWER—

Standard Pipe and Fittings, 3 to 24 in., Carload lots, f.o.b. factory:
First-class.....85%
Second-class.....87½

PLATES—

Felloe.....lb. 3¼@4¢

PLIERS AND NIPPERS—

Button Pliers.....75&10@80%
Gas Burner, per doz., 5 in., $1.25@$1.30; 6 in., $1.45; $1.50.

Gas Pipe	.7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers.....50%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's.....60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools, 40@40&10%

RASPS, HORSE—

Delta Brand.....70%
Disston's.....75%
Heller Bros.....75@75&10%
Liveright Bros.' Gold Medal.....70%
McCaffrey's American Standard....60&10@5%
Nicholson.....70&10@75%
See also Files.

RIDDLES, HARDWARE GRADE—

16 in.....per doz., $2.50@$2.75
17 in.....per doz., $2.75@$3.00
18 in.....per doz., $3.00@$3.25
For galvanized, add 50¢ per doz.

RIVETS—

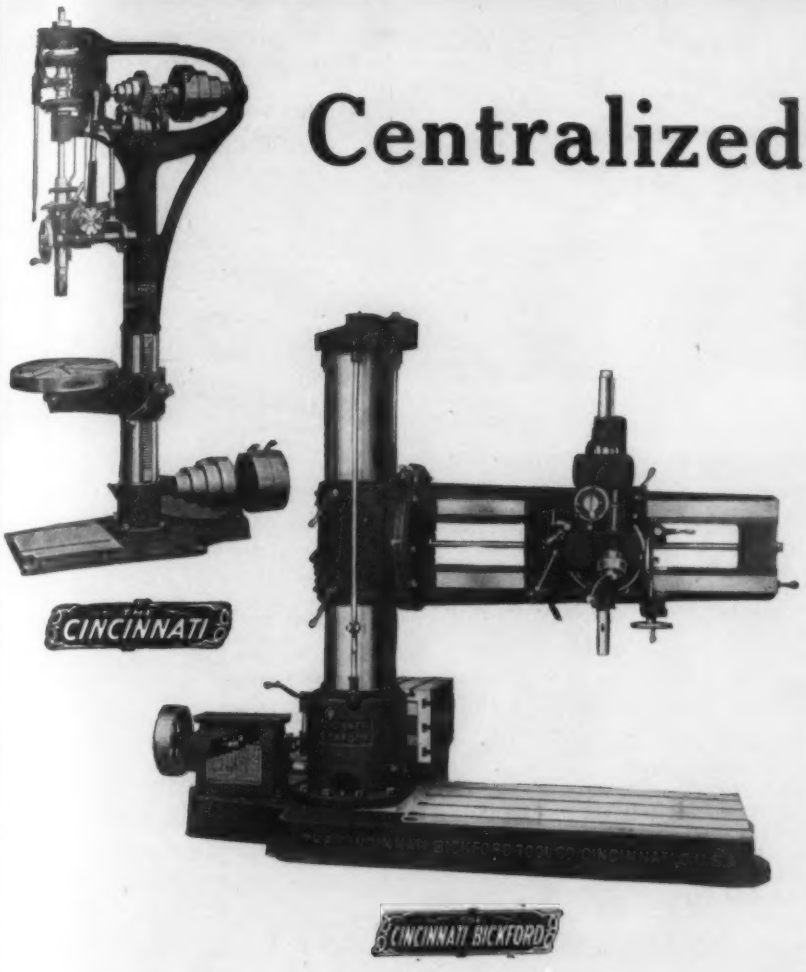
Copper Rivets and Burrs.....40&10%
Tinners' and Miscellaneous Rivets..70&10@75%
Structural, base, ¾-in. and larger..$2.10@$2.50
Boiler cone head, ¾-in. and larger.$2.20@$2.60

Bifurcated and Tubular—

Assorted in Pasteboard Boxes.
Bifurcated, per dozen boxes, 50 count, 40 @45¢; 100 count, 50@63¢.
Tubular, per doz. boxes, 50 count, 60@68¢; 100 count, $1.12@$1.26.

ROPE—

Per Pound.
Eastern Retail Trade.
Manila, 7-16 in. diam. and larger:
Highest Grade.....14¢
Second Grade.....13¢
Hardware Grade.....13¢
Sisal, 7-16 in. diam. and larger:
Highest Grade.....9½¢
Second Grade.....8½¢



Centralized Control

On the Cincinnati Upright and the Cincinnati Bickford Radial Drilling Machines all levers and controls are within easy reach and right in front of the operator. On duplicate production work, he gives all his energy to driving the machine, letting it do all the work and labor.

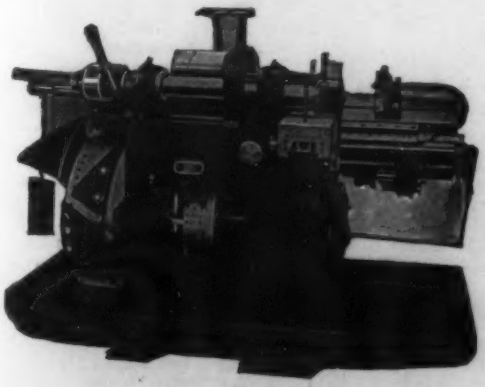
Your master machinist has a drilling problem. Something that he thinks could and should be quicker and at less cost. Put it up to us for solution. We have been making drilling machines and using them for 40 years, and the knowledge gained through contact with our customers, some probably in your line who faced and overcame problems similar to yours, is at your disposal. Put it up to us.

The Cincinnati-Bickford Tool Co.

Oakley, Cincinnati, Ohio

With Gridley Automatic Turret Lathes

There is no Overhang to the Tools



Automatic Turret Lathe—Single Spindle

THIS "No Overhang" feature gives Gridley operators a decided advantage, as it permits a better design of turning tools to be used and also permits drills to be more rigidly supported and held closer to the work. A more accurate product is always the result. But this exclusive feature accomplishes more than that, it allows ample room to attach one tool back of another; that is why Gridley operators frequently do at one operation the same work that requires two or more operations on any other turret lathe. Not only is the output greater, because heavier feeds and coarser cuts can be taken, but a much wider range of work can be handled, simply because there is sufficient room to attach the necessary tools that cannot be used on other automatic turret lathes.

Gridley Automatics will handle work twice the length that other machines can. Made in both Single and Multiple Spindle. Send for Catalogue.

Windsor Machine Co.

Windsor, Vt., U. S. A.

OFFICES AND REPRESENTATIVES: MANNING, MAXWELL & MOORE, INC., Agents for United States and Canada.
Office for Great Britain, France, Belgium and Switzerland, 66 Avenue de la Grande Armee, Paris. J. RYAN, Manager.
FOREIGN AGENTS: CRAVEN BROTHERS, LTD., Manchester, England, Great Britain and Colonies. CHARLES CHURCHILL & CO., LTD., London, Birmingham, Manchester and Newcastle-on-Tyne, England, and Glasgow, Scotland. M. KOYEMANN, Charlottenstrasse 112, Dusseldorf, Germany, Austria-Hungary, Italy, Switzerland, Norway, Sweden. SCHUCHARDT & SCHUTTE, Norway, Sweden, Russia, China, Japan.

Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Pure ..... 9½¢
Sisal, Tarred, Medium Lath Yarn:
Pure ..... 9¢
Cotton Rope:
Best 5-16-in. and larger ..... 19½@20¢
Medium, 5-16-in. and larger ..... 17½@18½¢
Common, 5-16-in. and larger ..... 10¢
In coils, ½¢ advance.
Jute Rope:
Rove, ¼-in. and up...No. 1, 7½¢; No. 2, 7¢

Wire Rope—

Galvanized ..... 47½&2½%
Plain ..... 55&2½%

RULES—

Boxwood ..... 60&10&5%
Ivory ..... 25&5@30%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory ..... 25@25&10%
Miscellaneous ..... 50@50&10%
Stephens' Combination 55%
Stationers' ..... 50@50&10%
Keuffel & Esser Co.:
Folding Wood ..... 35&10%
Folding, Steel 33⅓%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber ..... 50&10%
Upson Nut Co.:
Upson Nut Co., Boxwood ..... 60&5%

SCALES—

Union Platform, Plain ..... $2.10@$2.25
Union Platform, Stpd ..... $2.15@$2.50
For double beam, add 50¢ each.
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
Reading Hardware Co ..... 50&5%
The Standard Portables 40%
The Standard R. R. & Wagon ..... 50&10%

SCREWS—

Coach and Lag—

Lag, Cone Point 80%
Coach, Gimlet Point 80%

Jack—

Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%

Machine—

Cut Thread, Iron, Brass or Bronze:
Flat Head or Round Head ..... 50&10@50&10&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10@80&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—

Set (Iron) 80%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10&5@70&10&10%
Hex. Hd. Cap ..... 70&10&5@70&10&10%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—

List July 23, 1903.
Flat Head, Iron ..... 87½&5@..%
Round Head, Iron ..... 85&5@..%
Flat Head, Brass ..... 80&5@..%
Round Head, Brass ..... 77½&5@..%
Flat Head, Bronze ..... 75&5@..%
Round Head, Bronze ..... 72½&5@..%
Drive Screws ..... 87½&5@..%

SHOES, HORSE, MULE, &c.—

F.o.b. Pittsburgh:
Iron ..... per keg $4.10
Steel ..... per keg $3.85

SHOVELS AND SPADES—

Association List ..... 40&10@50%

SIEVES—

Seamless Metallic—

	Per Dozen.			
Iron Wire	$1.05	1.05	1.10	1.20
Tinned Wire	$1.25	1.25	1.25	1.35

Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested ..... doz. $0.90@0.95
Mesh 20, Nested ..... doz. $1.00@1.05
Mesh 24, Nested ..... doz. $1.40@1.50

SKEINS, WAGON—

Cast Iron ..... 70@70&10%
Steel ..... 35@40%

SPRINGS—

Carriage, Wagon, &c.—

	Per 100 lb.
1¼ in. and Wider:	
Black	$4.75@$5.00
Half Bright	$4.75@$5.00
Bright	$5.25@$5.50
Painted Seat Springs:	
1½ x 2 x 26	per pair .45@47¢
1½ x 3 x 28	per pair .68@71¢

STOCKS AND DIES—

Blacksmiths' ..... 50@50&10%
Curtis Rev'ble R'chet Die Stock 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plate 25%

TACKS, FINISHING NAILS, &c.

American Carpet Tacks ..... 90&10@—%
American Cut Tacks ..... 90&10@—%
Swedes' Cut Tacks ..... 90&10@—%
Swedes' Upholsterers' ..... 90&10@—%
Gimp Tacks ..... 90&20@—%
Lace Tacks ..... 90&20@—%
Trimmers Tacks ..... 90&20@—%
Looking Glass Tacks ..... 65@—%
Bill Posters' and Railroad Tacks ..... 90&40@—%
Hungarian Nails ..... 75&10@—%
Finishing Nails ..... 70@—%
Trunk and Clout Nails ..... 75&10@—%
NOTE.—The above prices are for Straight Weights.
See also Nails, Wires.

Double Pointed—

Double Pointed Tacks ..... 90&10&10&10&10%

TAPES, MEASURING—

American Asses' Skin ..... 50&5%
Patent Leather ..... 25@30&5%
Steel ..... 33⅓@33⅓&5%
Chesterman's ..... 25@35%
Keuffel & Esser Co.:
Favorite, Ass Skin 50%
Favorite, Duck and Leather ..... 25&10%
Metallic and Steel, lower list, 35@35@5%;
Pocket ..... 35&10%
Lufkin's:
Asses' Skin ..... 40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather ..... 25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc 25%
Chesterman's Steel, No. 1638L, etc 35%

TRUCKS, WAREHOUSE, &c.—

McKinney Trucks ..... each, net $10.00

VISES—

Solid Box 60%

Parallel—

Fisher & Norris Double Screw Leg, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00 ..... 20%
Merrills 25%
Millers Falls Oval Slide Pattern ..... 60&10%
Parker's:
Victor, 20@25%; Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55@60%
Trojan's ..... 60&25%

Pipe—

Curtis & Curtis Malleable 25%
Fisher & Norris, No. 0, $16.00; No. 1, $24.00.
Parker's Combination:
87 Series, 60%; 187 Series, 60 & 5%; No. 870, 40%.
Competitive Combination's ..... 65&70%

VISES, WOODWORKERS'—

Fisher Bench and Woodworkers' Special, No. 1 ..... $12.50

WASHERS—

Leather, Axle—

Solid ..... 85&10@90%
Patent ..... 85@85&10%
Coil: ⅜ 9¢ | 1 10¢ | 1⅛ 11¢ | 1¼ 14¢ inch, per box

Iron or Steel—

Size bolt	5-16	⅜	½	⅝	¾
Washers	$5.15	4.25	3.15	2.95	2.25

The above prices are based on 6.25 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

WHEELS, GRINDING—

Pike Mfg. Co., Corundum, 65%; Emery 75%

WIRE—

Market and Stone Wire in Bundles—

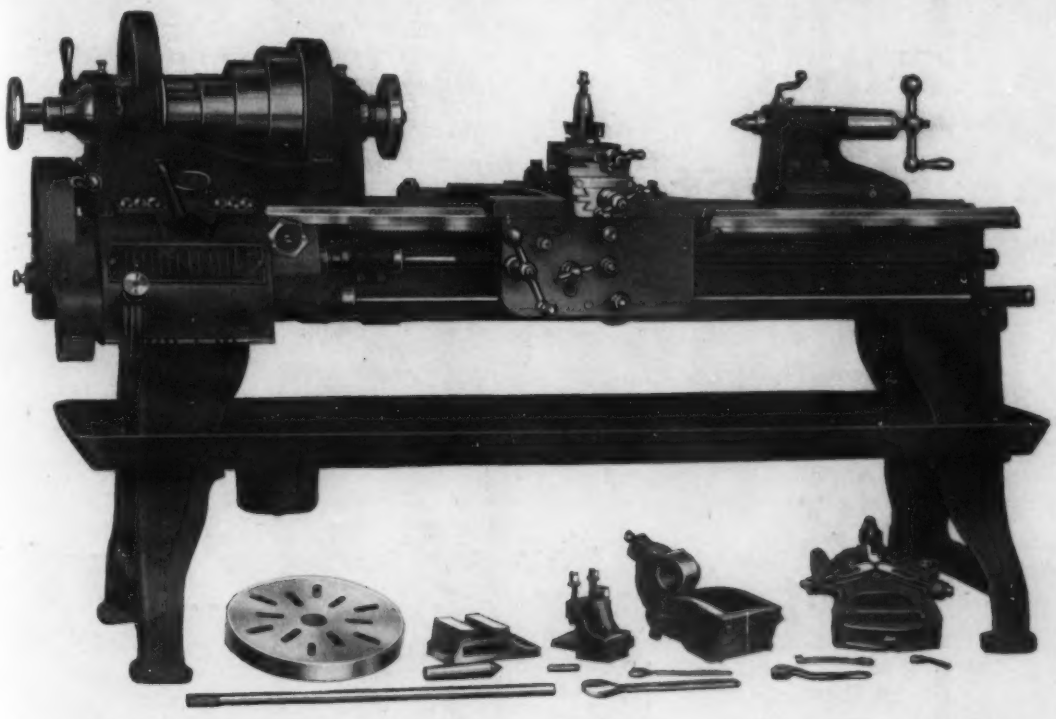
Bright and Annealed:
9 and coarser 80%
10 to 18 ..... 80&10%
19 to 26 ..... 80&10&2½%
27 to 36 ..... 80&5%
Galvanized:
9 and coarser ..... 75&10%
10 to 16 ..... 75&10%
17 to 26 ..... 72½&10%
27 to 36 ..... 72½%
Coppered:
9 and coarser ..... 75&10%
10 to 26 ..... 75&10%
27 to 36 ..... 70&10&5%
Tinned:
6 to 18 ..... 75&10&10%
Brass ..... 20¢ lb., base
Copper ..... 22¢ lb., base
Cast Steel Wire 50%

Spooled Wire—

Annealed and Tinned ..... 70&10&5%
Brass and Copper ..... 60&10&5%
Retailers' Assortments, per box ..... $2.35@$2.50

WRENCHES—

Agricultural ..... 80&5@80&10%
Alligator or Crocodile ..... 75@80%
Baxter Pattern S Wrenches ..... 70&5@70&10%
Drop Forged S ..... 50&10@60%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut ..... 50&10%
Combination Black ..... 50&10%
Merrick Pattern ..... 50&10%
Steel Handle Screw ..... 50&10%
Wood Handle Screw ..... 50&10%
Coes' Genuine Knife Hdl ..... 50@50&10%
Coes' Genuine Steel Hdl ..... 50@50&10%
Coes' Genuine Key Model ..... 50@50&10%
Coes' Genuine Hammer Handle ..... 50@50&10%
Coes' "Mechanics'" ..... 50&10@50&10&10%
Hercules 70%
Star Mfg. Co. Wrenches:
Elgin, Alligator Pattern, Adjustable
Elgin Wrenches only ℔ doz $12.00
Elgin Rethreading Attachment, with one die ℔ doz $12.00
Elgin Extra Jaws ℔ doz $3.00
Elgin Dies assorted, ℔ doz $6.00
Elgin Boxed Sets each $5.30
Star, Adjustable Pipe, case lots each 10 in. $2.25; 14 in. $3.00; 18 in. $4.00; 24 in. $6.00 ..... 50&10&10%
Case lots 50%
Whitman & Barnes Mfg. Co.:
Acme ..... 60&10%
Alligator Pattern, Bull Dog 75%
Machinist, case lots 60%
Less than case lots ..... 50&10%
Railroad Special, case lots ..... 50&10%
Less than case lots 50%
J. H. Williams & Co.:
Agrippa Chain Pipe ..... 50&10%
Vulcan Improved Chain Pipe 50%
Wizard Adjustable Ratchet, per doz $15.00
Shark Adjustable Pipe ..... 50&10%



"Reed" Lathes are adaptable to Fine Tool Room Work

We build them for this class of work, and they prove as highly efficient as do all other Reed Lathes in their respective fields.

For Turning, Facing, Lead Screw, they give extreme accuracy of work and are capable of large production. Convenient and easy to operate, they are a great favorite with the men who run them.

A leading feature is the Quick Change Gear Mechanism, *easy to read and operate,* giving 60 Changes of Speed to both Lead Screw and Feed Rod.

Reed Lathes are built as well and thoroughly as the best materials and master mechanics can make them. In universal use, they live up to every demand of the modern manufacturer. All Reed Engine Lathes can be equipped with D. C. Motor Drive when so desired.

We will send full descriptive catalog upon request.

F. E. REED COMPANY, DEPT.

REED-PRENTICE COMPANY

Worcester, Mass., U. S. A.

SELLING AGENTS

MANNING, MAXWELL & MOORE, Inc., 85-87-89 Liberty Street, New York

Philadelphia San Francisco Cleveland Boston St. Louis Buffalo Pittsburgh
Indianapolis Chicago Mexico City Detroit Milwaukee Los Angeles Yokohama, Japan

Thomas & Lowe Machinery Co., Providence, R. I. Syracuse Supply Co., Syracuse, N. Y. The Chas. A. Strelinger Co., Detroit, Mich. Fenwick Freres & Co., Paris, France. Charles Churchill & Co., Ltd., London, England. Van Rietschoten Houwens, Rotterdam, Holland. Moscow Machine Tool & Engine Co., Moscow, Russia. C. & J. W. Gardner Co., St. Petersburg, Russia. F. G. Kretschmer & Co., Frankfort a.M., Germany. The A. R. Williams Machinery Co., Ltd., Toronto, Ont. Williams & Wilson, Ltd., Montreal, Canada. Alexander & Garsed, Charlotte, N. C.

Mechanical and Civil Engineers,
PITTSBURGH, PA.

The Worst of a Big Lathe

is that it costs too much. Everything proves that to you.

You've big work—yes—but not enough—that's the principle that leads hundreds of shops to buy McCABE'S "2-in-1" DOUBLE-SPINDLE and save half the big price.

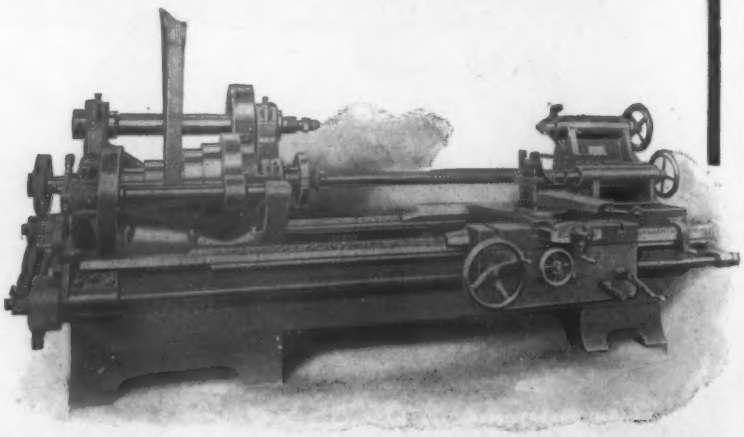
And the "one more Lathe" of McCABE'S "2-in-1" LATHE is what you want for more work when the big Lathe's not working.

"Don't pay a high price and get a lesser Lathe."

J. J. McCABE

"The Double-Spindle Lathe Man."

30 Church Street, New York City

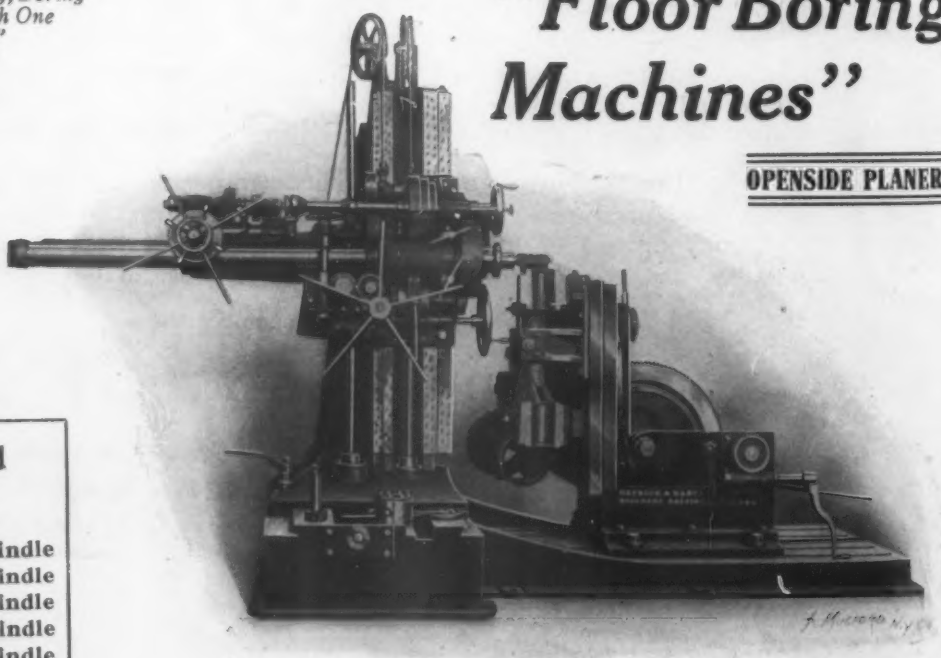


Doing small work on a big Lathe. McCabe's "2-in-1" Double-Spindle Lathe, 26/48-in. Swing cutting coarse pitch screw on 26-in. swing.

Write for our booklet, "Nine Operations Drilling, Boring and Milling with One Chucking."

"Floor Boring Machines"

OPENSIDE PLANERS



Standard Sizes

No. 0 with 3½" Spindle
No. 1 with 4" Spindle
No. 2 with 5" Spindle
No. 3 with 6" Spindle
No. 4 with 7" Spindle

No. 0 Drill with Universal Tilting and Rotary Table Milling Cylinder.

The Detrick & Harvey Machine Co., Baltimore, Md.

Foreign Representatives { Paul Auriol, Paris, France. Wilh. Sonesson & Co. Malmo, Sweden. Chas. Churchill & Co., London, Eng.

8

changes of feed on 26 to 50 inch swing drills

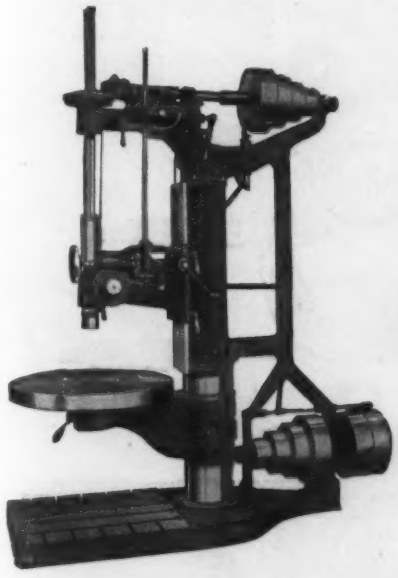
Barnes Drills

With A *Positive Feed* That Makes "Them Talk"

A Feed Adapted To Drilling, Reaming, Boring, Facing, Etc.

4

changes of feed on 20 to 25 inch swing drills



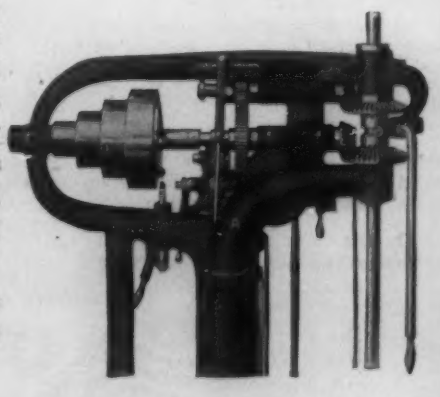
WE make a most complete line of Upright Drills; also Gang Drills and Horizontal Radial Drills. The real way to know what we make is to let us send our up-to-date Drill Catalog; look it over and if not wanting tools just now, then put it in your files for future reference.

Our tools are not in the experimental stage, but tried out and thousands are in use, giving the best of satisfaction. For instance: Look at our Positive Feed (been in the market since 1903), leads 'em all and today stands at the top in merit, strength and convenience of operating. Look at our Geared Tapping Attachment; the acme of perfection. Why? Because it has no studs for the gears, but is equipped with shafts and long boxes which give it strength and endurance; it works like a charm and does not jar when reversed.

Look at our Internal Back Gearing; been on the Market since 1885; the most perfected back gearing offered. Why? Because it has strength and endurance, is neat, compact and throws no oil.

Consider the material in our drills: We don't put cheap stuff in them; we can't do it and hold up our reputation; if we did use cheap stuff you would find it out sooner or later and we would suffer just as much as yourselves. For instance, we make our own castings and use charcoal, iron and the best grade of Southern iron; we use a high-priced babbitt metal for all bearings and you will appreciate its enduring qualities.

Accuracy is our "motto"; we give each machine and each part a most careful test and thus are able to produce a finely finished and accurate machine.



Send for Catalog

TRADE W.F. J.G. MARK B

W.F. & John Barnes Co.

69 Ruby Street, Rockford, Ill., U. S. A.

TRADE W.F. J.G. MARK B

GARVIN

Hand Milling Machines

(3 Sizes)

RAPID—ACCURATE—STRONG

GARVIN No. 2 Hand Milling Machine

USE CODE—"ACTRESS"

These machines are well adapted for light, quick cuts, as required in manufacturing small parts of typesetting machines, typewriters, hardware articles, electrical fixtures, sewing machines, etc.

The spindles have a taper bearing running in a bronze box of our standard form, and the overhanging arm is also of standard design.

The tables are fed by rack and pinion, with long, adjustable lever and are provided with adjustable stops both ways.

The saddles have screw adjustment in line with the spindle.

The knee of the No. 2 is moved by a long, adjustable lever through rack and pinion, and is nicely balanced in all positions, which gives an easy, sensitive motion and facilitates working.

On the Nos. 1 and 3 machines, the in-and-out and vertical adjustments have micrometer readings.

CAPACITY

No. 1.....12 x 4 x 12 in.
No. 2..... 5¼ x 3¼ x 5½ in.
No. 3..... 7 x 4 x 17½ in.

IMMEDIATE DELIVERIES.

Send for Circular No. 154

FOR FURTHER INFORMATION ASK YOUR DEALER OR WRITE US DIRECT

Manufactured by

The Garvin Machine Company

Spring and Varick Streets

45 Years in NEW YORK CITY **VISITORS WELCOME**

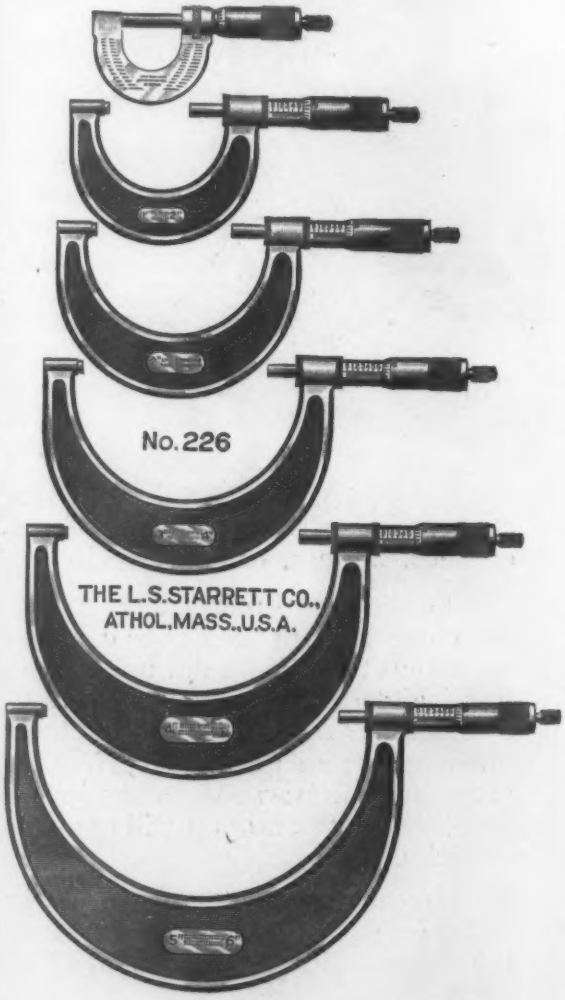
Starrett Tools

Little Jobs
and
Big Jobs

and all kinds of jobs may be measured with

Starrett Micrometers

A set of these micrometers ranging in capacity from 1 to 6 ins. will be found a most useful part of the equipment of the tool room of any big shop. Standards for use in adjusting these micrometers will be furnished when desired.



If you aren't familiar with the Starrett line send for Catalog No. 19AA and learn what other tools you should have in your shop.

The L. S. Starrett Co.

Athol, Mass.

NEW YORK
150 Chambers Street

CHICAGO
17 No. Jefferson Street

LONDON
36 & 37 Upper Thames Street, E. C.

42-99

The Shop Manager Says:

"Multiply the value of your floor space by getting a machine that will do the most work per square foot."

The Rochester Boring, Milling, Drilling and Tapping Machine

is just such a tool. It occupies the floor space of one machine but does the work of several.

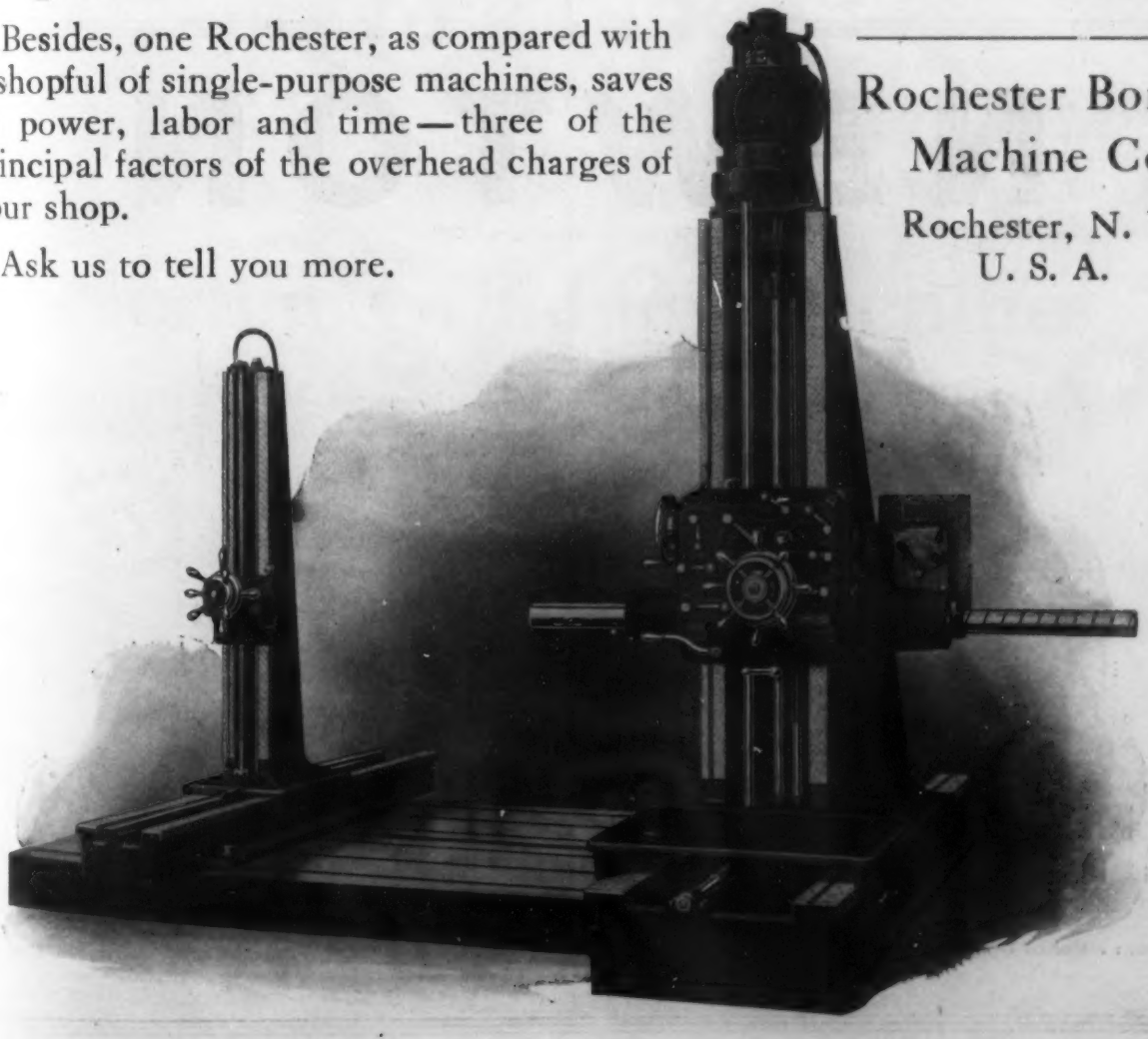
A shop equipped with single purpose tools is getting only a small fraction of the production per square-foot of floor space that one Rochester Machine will give.

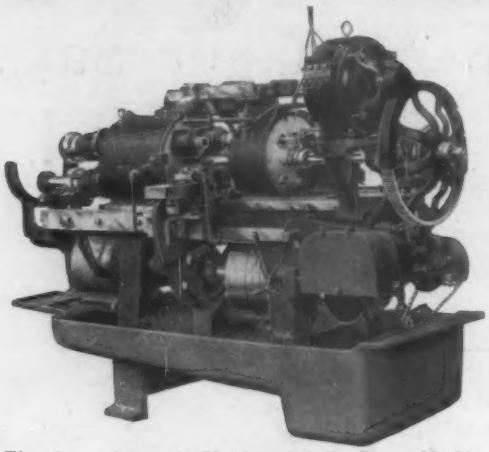
Besides, one Rochester, as compared with a shopful of single-purpose machines, saves in power, labor and time—three of the principal factors of the overhead charges of your shop.

Ask us to tell you more.

Rochester Boring Machine Co.

Rochester, N. Y.
U. S. A.





The Acme Automatic Multiple Spindle Screw Machine.

Greater Production at the Same Cost

A METHOD which increases the production of duplicate parts with the same amount of labor and overhead expense cuts the cost per piece.

The Acme Automatic Multiple Spindle Screw Machine does just that by using eight or more tools at once, milling completed parts of uniform accuracy from the solid bar. This saves 50 to 200% over ordinary methods.

The Acme is fully automatic and one man can operate from four to six. As labor is a large item in manufacturing, this constitutes a great saving when the added production is considered.

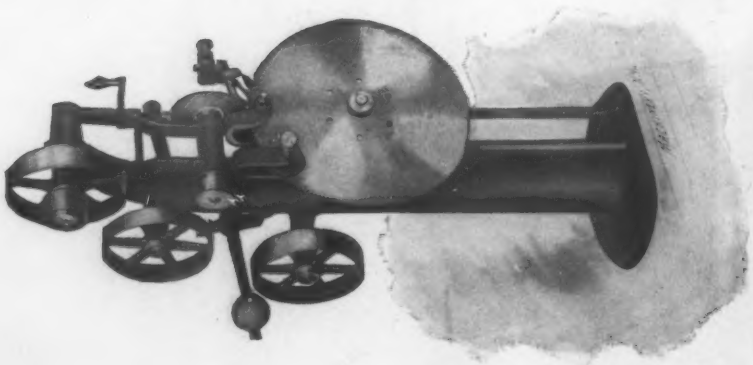
Do you want us to show you how it can be adapted to your work? Just ask for catalog "M 2." It also shows samples.

THE NATIONAL-ACME MANUFACTURING CO.
Cleveland, Sixth City

NEW YORK, 77 White St. | BOSTON, 141 Milk St. | DETROIT, 1222 Majestic Bldg.
CHICAGO, 23 So. Jefferson St. | ATLANTA, 3rd Natl. Bank Bldg. | MONTREAL, St. Henri & G. T. R.

NEWTON

(REGISTERED TRADE-MARK)



AUTOMATIC SAW GRINDING MACHINE
Will sharpen both solid and inserted tooth saw blades from 12" to 40"

NEWTON MACHINE TOOL WORKS, Inc.
PHILADELPHIA, U. S. A.

FOREIGN REPRESENTATIVES:

Berlin: Heinrich Dreyer. Vienna: Rudolf Salzer. Italy, Spain, Switzerland, Belgium and France: Fenwick Frères & Co., Paris. Williams & Wilson, Montreal, Canada.

Flanged Wheels of Vanadium Steel

for use on the emergency gates at the Panama Canal

Ground on Norton Grinding Machines

Two thousand of these wheels, case hardened forgings, rough turned, represented a severe test for grinding.

Little difficulty was experienced, however, in grinding them to proper size and finish on

Norton Grinding Machines

They were finished rapidly—economically and in such manner as would be practically impossible by any other method.

This offers an example of the possibilities of Norton Grinding Machines—how their adoption can materially benefit your conditions.

Finish—Accuracy—Production—all are combined in the operation of these machines and all are essential to best results in your output of work.

May we mail you catalog N-8, which explains in detail?

Norton Grinding Co.

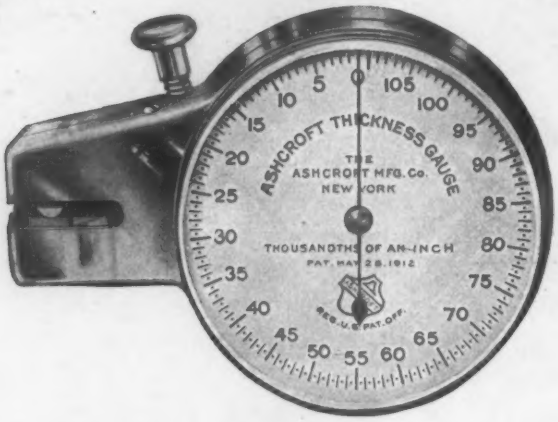
Worcester, Mass.

Chicago Store: 11 No. Jefferson St.

AGENTS:—Vonnegut Machinery Co., Indianapolis. Robinson, Cary & Sands Co., St. Paul and Duluth. Manning, Maxwell & Moore, St. Louis, Philadelphia. Prentiss Tool & Supply Co., New York, Boston, Buffalo, Rochester, Syracuse, Scranton. Motch & Merryweather Machinery Co., Cleveland, Detroit, Cincinnati and Pittsburg. The Canadian Fairbanks Co., Montreal, Toronto, Vancouver. Alfred Herbert, Ltd., Coventry, England; Paris, France and Milan, Italy. Schuchardt & Schutte, Vienna, Prague, Budapest. F. W. Horne, Tokio, Japan.

196 N

READ THE DIAL



of The Ashcroft Thickness Gauge

Easier than reading the spindle of a micrometer caliper, isn't it? The white enamel dial makes the graduations stand out distinctly. It is possible to read the gauge to 0.00025 in. Adapted for measuring the thickness of sheet metal and rubber, leather, paper board or any other sheet material not over 0.11 in thickness. In the construction of the gauge all sliding parts have been eliminated, the movement being mounted on steel pivots. In this way friction and wear are reduced to a minimum. Price $10.00. Calf Skin Case 50c. extra.

The Ashcroft Mfg. Co.

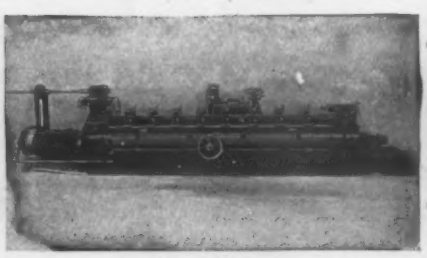
85 Liberty Street - - - - - - New York

PRECISION GRINDING MACHINES

Landis Plain Grinding Machines

10" x 20", 10" x 30" 12" x 32", 12" x 42", 12" x 66", 12" x 96", 12" x 120", 16" x 72".

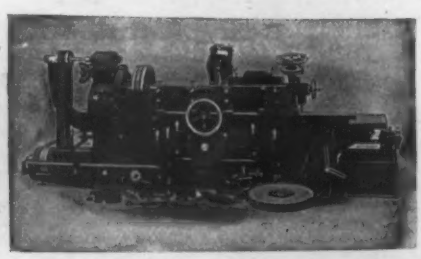
These machines are intended for finishing straight and taper spindles, shafts, rolls, tubing and all other work within their range which can be revolved on dead centers.



Large Type

Standard sizes: 20" x 96", 20" x 120", 20" x 144", 20" x 168".

These manufacturing machines are adapted for straight and taper cylindrical shafts, spindles, pistons, Corliss valves, plungers, tubing and are especially desirable for grinding hardened steel and iron rolls.



Plain Grinding Machines with Gap

These are our 16" and 20" swing Plain Machines built with gap in the bed to suit the location of the projection on the work.

Largest exclusive manufacturers of grinding machines in the world.

Landis Universal Machines (Large Type)

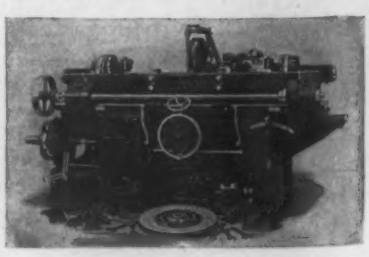
No. 1 (10" x 20"), No. 1½ (10" x 30"), No. 2 (12" x 32"), No. 3 (12" x 42"), No. 4 (12" x 66").

Nos. 2, 3 4 (also built with 16" swing) are used for finishing tools and a variety of straight or taper parts (both external and internal) as are common to the toolroom, machine shop, railroad shop, etc.

Attachments such as magnetic chuck, gear cutter attachments, cam grinding attachment, side mill grinding attachment, etc., can be used on these machines.

Landis Internal Grinding Machines

This machine is intended for straight and taper internal grinding. The fixtures for these machines will grind holes ¼" diameter or larger and up to 12" long.



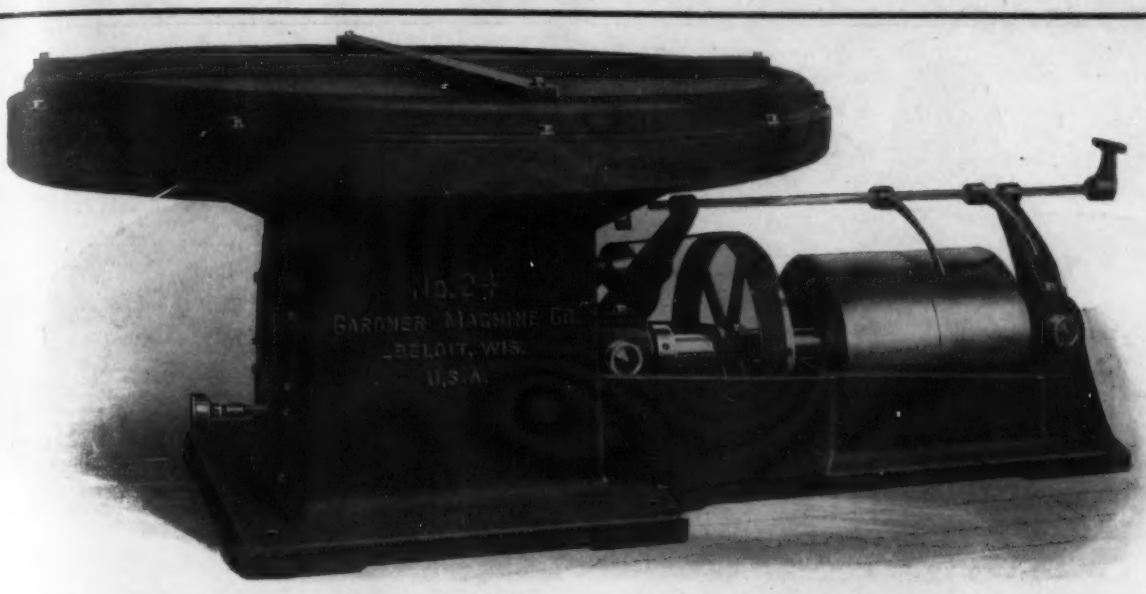
Landis Crank Grinding Machines

These machines are designed for grinding single or multiple throw crank shafts used in gas and small steam engines.

Descriptive and Illustrated Literature for Each Size.

LANDIS TOOL CO.

WAYNESBORO, - - PENNA., U. S. A.



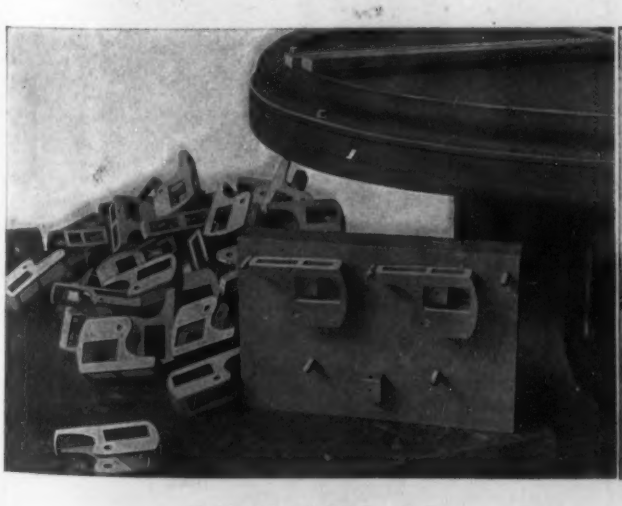
2,000 Square Inches of Cutting Surface

and 100 cutting tools to each square inch make 200,000 cutters all operating at once. This fact explains to some extent the remarkable efficiency of Gardner Disc Grinders, and why these machines are constantly growing in favor with manufacturers.

The machine above illustrated is a Gardner No. 24 Vertical Spindle Disc Grinder. It carries a 53-inch diameter disc wheel which travels in a fixed plane at a speed of 600 revolutions per minute. The work to be machined is simply laid on this revolving wheel—carrying 200,000 abrasive cutters, and allowed to remain till finished. Suitable cross bars prevent the work from traveling with the wheel. A number of pieces, according to size, can be ground at the same time.

Special provision is made for carrying off dust and grit. The bevel gears which drive the disc wheel are fully enclosed and run immersed in oil.

The illustration below shows wrench frames being ground on our No. 24. Four holders, each carrying 3 frames, are used for this operation—12 faces are being ground at once. This machine covers a very wide range of work, handling large pieces as well as small ones.



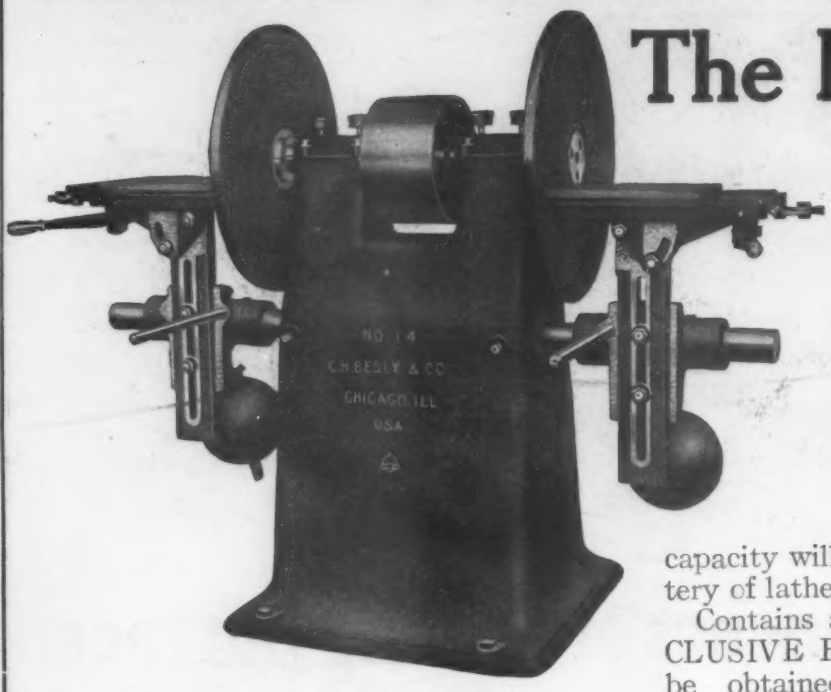
Holder Partially Loaded

Loaded Holder in Grinding Position

Literature. The August issue of the "Gardner Grinder" contains a detailed report of grinding wrench frames on our No. 24. We also have complete literature covering vertical spindle disc grinding, all of which will be sent for the asking.

GARDNER MACHINE COMPANY

BELOIT **(The Disc Grinding Authorities)** **WISCONSIN**



No. 14-26" L. BESLY GRINDER.

Disc Wheels 26" dia. weighing 125 lbs. each.
Spindle Pulley 12" diameter for 7" belt.
Total crated weight, 3,600 lbs.
Code Word—NULL.

The Last Word

In a Manufacturing Disc Grinder for Heavy Duty

Inexpensive in first cost and upkeep.

Can be operated by unskilled labor.

Accommodates two operators.

On flat surfacing within its capacity will do the work of a whole battery of lathes, planers, millers or shapers.

Contains all those Patented and EXCLUSIVE FEATURES which can only be obtained in genuine Besly Grinders.

Ask for 1912 Edition Besly's Modern Disc Grinding Practice and study this important subject. 112 pages, 103 pictures. Mailed Free. Write Now.

BESLY CHICAGO

CHARLES H. BESLY & COMPANY

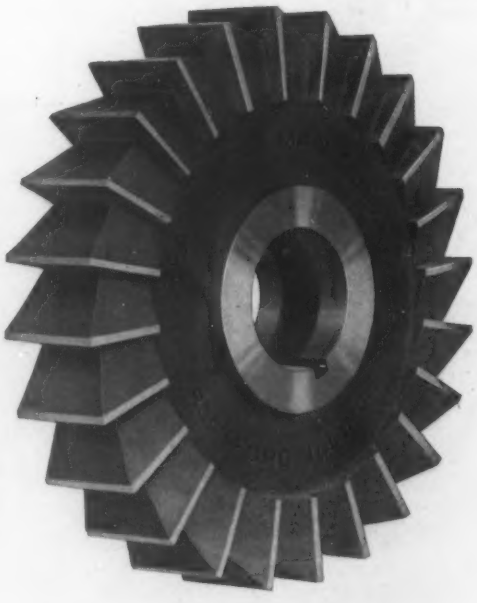
CHICAGO (Originators of Disc Grinders) U. S. A. Registered Trade-Mark

THE ROCKFORD DRILLING MACHINE Co. · ROCKFORD · ILL., U.S.A.

Rockford Gang Drills

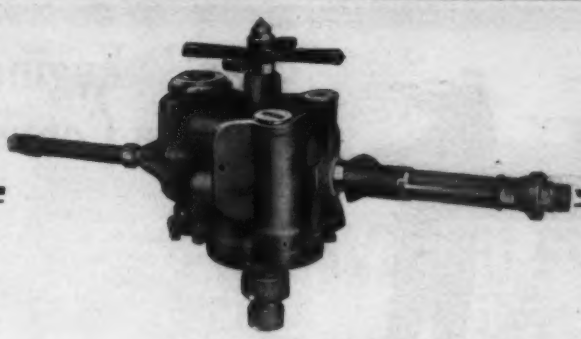
are made with from 2 to 6 spindles, each spindle driven separately and fed independently (Positive Geared Feed). Power—speed—precision. Ask for details.

Rockford Drilling Machine Co.
ROCKFORD, ILL. U. S. A.



We guarantee our Milling Cutters absolutely in respect to material, workmanship and accuracy. If you appreciate good ones, you will like these, and be glad you heard of them.

Barber-Colman Company
Rockford, Illinois



"Little David" Drill

Little Things with Big Duties

In the Ingersoll-Rand shops, nothing is so small that we can afford to slight it in any detail. We have a standard to maintain.

The biggest things we build are air compressors —the smallest, pneumatic tools. **But we put just as much study and care and skill into the manufacture of a pneumatic hammer or drill, as we do into the building of an 8000-foot compressor.**

Now, everything going out under the name Ingersoll-Rand **must represent us** to the purchaser—must be typical of the quality of **all** our products—must be indicative of what a customer may expect from **any** Ingersoll-Rand machine.

That is the very best reason we can offer why you should buy and use Ingersoll-Rand Pneumatic Tools, as representative of the very best in design, materials, workmanship and performance.

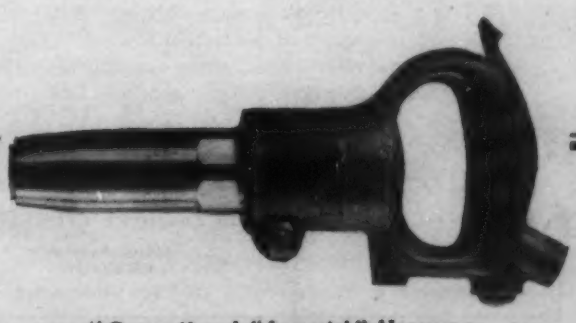
We put a heavy duty on our tools, as representing us. You may do the same, working for you.

NEW YORK **INGERSOLL-RAND CO.** LONDON

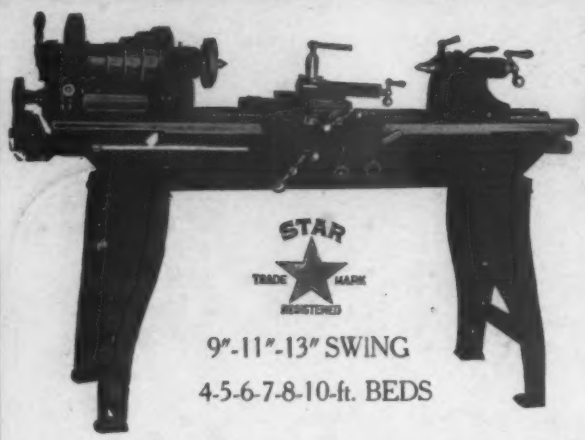
Offices in All Principal Cities of the World

COMPRESSORS AIR TOOLS AIR HOISTS SAND RAMMERS

PT-13



"Crown" and "Imperial" Hammers



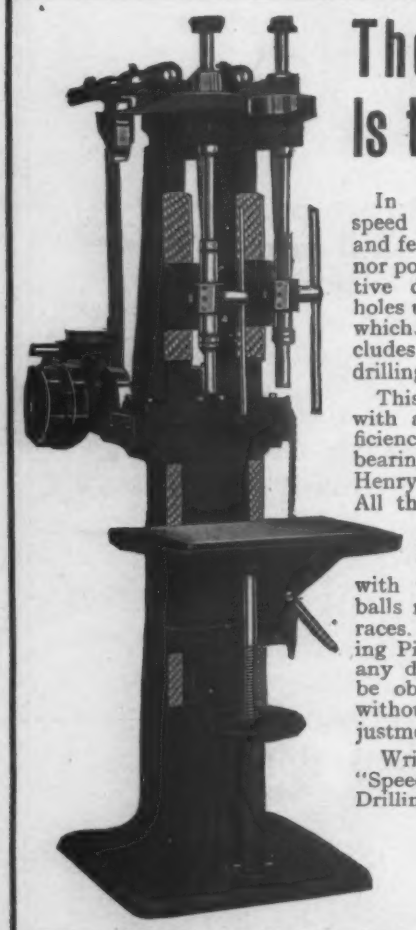
"Star" Engine Lathes Are Accurate, Convenient, Durable

In light manufacturing, toolroom, experimental laboratory, school and repair work, no machine can equal "Star" 9", 11" and 13" Engine Lathes. For economical and accurate production at low costs, they have proved their value over and over in actual service, and we are willing to put them to any sort of competitive test you can devise. Finished for "service"—not for looks—and built in quantities. Sold at "fair" prices.

Latest catalog mailed on request

The SENECA FALLS MFG. CO.
255 Water Street, Seneca Falls, N. Y., U. S. A.

286-A



The Speed Is the Thing

In sensitive drilling speed is all important and feed sinks to a minor position. By sensitive drilling we mean holes up to ½ of an inch which, of course, includes most of your drilling.

This can be obtained with any degree of efficiency only on ball bearing machines of the Henry and Wright type. All the power is transmitted right down to the drill. They are equipped with the best German balls running in ground races. The patent Sliding Pinion Lever allows any desired leverage to be obtained in feeding without stopping for adjustment.

Write for chart "Speeds and Feeds for Drilling."

The Henry & Wright Mfg. Co.
760 Windsor Street, - HARTFORD, CONN.

"MORSE"

It is very important that you know about tools before purchasing. Would a "MORSE" Catalogue interest you? It is free to all interested. "MORSE" TOOLS comprise Drills, Reamers, Milling Cutters, Taps, Dies, Chucks, Arbors, Sockets, Sleeves, Mandrels, Gauges, Etc.

The MORSE COMPANY also makes Plain and Universal Grinding Machines, Bench Centers; and Machines for testing Spur Gears, Bevel Gears and Worm Gears. Send for illustrated and descriptive circulars.

Morse Twist Drill & Machine Co.,
NEW BEDFORD, MASS., U. S. A.

Without Superlatives

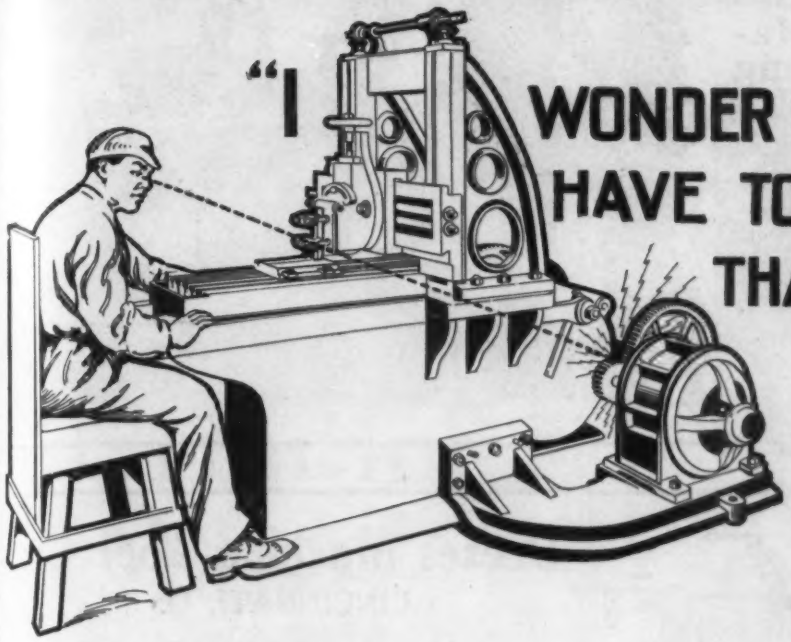
IT is a difficult task to write this ad. STERLING wheels so nearly represent that acme of perfection towards which we are all striving that we can scarcely refrain from using superlatives when describing them.

No words, however, can convince you like a trial of the wheel itself. Will you let us send you some at our own risk and prove their value?

THE STERLING EMERY WHEEL MFG. CO.
Main Office and Factory: TIFFIN, OHIO, U. S. A.

Selling Agencies:

NEW YORK	CHICAGO	SAN FRANCISCO
45 Vesey St.	15 So. Clinton St.	139 Townsend St.

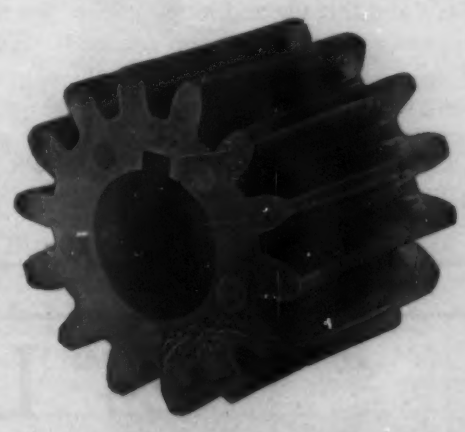


"I WONDER HOW LONG I'LL HAVE TO PUT UP WITH THAT NOISE"

There's no excuse for Noisy Gear Drives

NOISE in gear drives is only an evidence of preventable wear, a forerunner of destruction and a distraction that takes men's minds from their work. Remove that noise and you do much toward preserving the life and accuracy of the machine. Then when you complain of their work, your men can't complain of their tools.

New Process Noiseless Pinions stop this noise, vibration and ruin because their teeth, being flexible, distribute the load over greater areas on a greater number of tooth faces where the rigidity of metal to metal permits only line contact on few teeth. The real benefits are especially evident on drives subjected to heavy intermittent load with fly wheel effect. Such drives, when metal to metal, invariably develop vibration and as the backlash increases are a prolific source of trouble and expense from stripped gear teeth. On drives where these conditions are most severe, numerous manufacturers have discarded metal pinions and substituted New Process Pinions as a standard part, and the trouble has been completely overcome.



New Process Pinions do as much hard work and last as long as metal pinions, but the teeth will not strip or break until worn down to a knife edge. Try one on your worst drive. Write for a book on "Noiseless Gearing."

NEW PROCESS IS TO ALL OTHER RAWHIDE AS STEEL IS TO IRON

The NEW PROCESS N.P.R.H. RAW HIDE Co.

OFFICE & WORKS SYRACUSE, N.Y.

REG. U.S. PAT. OFF.

CANADIAN AGENTS: Robert Gardner & Son, Ltd., Montreal

45

TURRET LATHES—Turret Screw Machines—Brass-working Machine Tools.

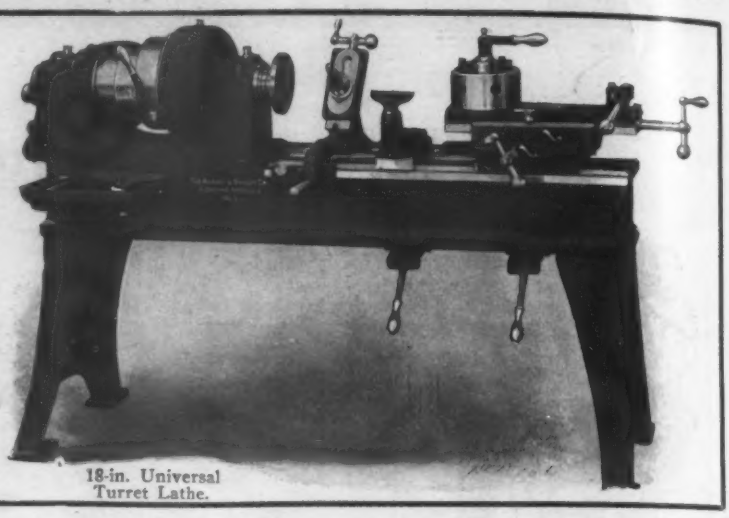
Turret Lathes—12 to 24" swing. With Plain, Set-over or Universal turret. Every modern feature for rapid production.

Turret lathe equipments planned—estimates of output furnished—or representative will visit you.

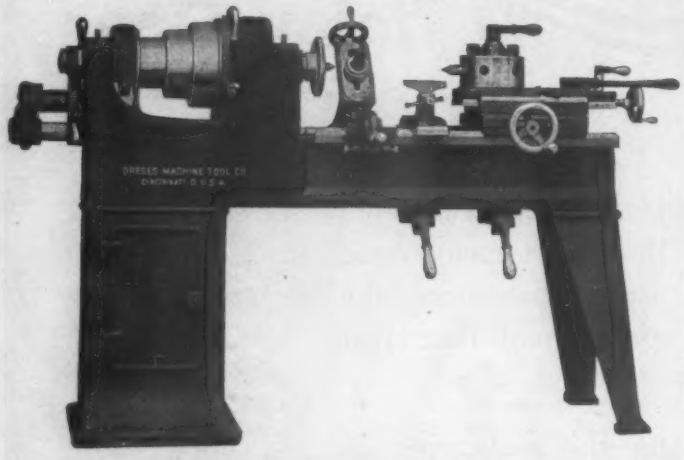
The Warner & Swasey Co.

CLEVELAND, OHIO

New York Office: Singer Bldg.
Boston Office: Oliver Bldg.
Chicago Office and Show Rooms: 618-622 W. Washington Blvd. Detroit Office: Ford Bldg.



18-in. Universal Turret Lathe.



Dreses Machine Tool Co.

CINCINNATI, O.

SCREW MACHINES TURRET and BRASS LATHES

All sizes and styles.
Most modern redesigned and improved.

WRITE

Bradford Quick Change Gear Lathe

All levers are always in easy reach of the operator. It has an unlimited range of feeds and threads and has one lever for all threads and automatic stop for feeds. The Head and Tail stocks are well fitted and clamped so as to eliminate chatter and insure accuracy of cut. The Tailstock is of the over-hung type permitting use of Compound Rest at right angles when turning short centers.

The Bradford Machine Tool Co.
Cincinnati, Ohio, U.S.A.

24" LATHES
For Immediate Delivery

ALSO OTHER SIZES

Write for our Complete List of Machine Tools

THE FAIRBANKS COMPANY

ALBANY BALTIMORE BOSTON BUFFALO HARTFORD NEW ORLEANS NEW YORK
PITTSBURG PHILADELPHIA PROVIDENCE SYRACUSE

NORTON

Your Grinding Wheels

Do your foreman's requisitions call for "Alundum" or "Crystolon" Grinding Wheels? Or do they merely specify "Grinding Wheels"?

If, like many other manufacturers, you are crowding things to the limit in order to obtain larger production, you ought to be sure that your grinding is being done efficiently and economically.

Grinding costs have been reduced in a great many plants by having a man who has made a scientific study of the subject and who is capable of selecting the best wheel for the work, look over the ground.

Remember when ordering grinding wheels that there are many abrasives, many sizes of grain and a variety of grades, and only one combination will make the best wheel for *you*.

You cannot select that wheel without knowing how the different combinations act on different metals and under different conditions.

We believe that we can help you if you will let us, and every order for Norton Wheels includes Norton experience and Norton service.

Norton Company

Worcester, Mass.

Alundum Plant, Niagara, Falls, N. Y.
Crystolon Plant, Chippawa, Canada
New York Store, 151 Chambers Street
Chicago Store, 11 N. Jefferson Street

601

Profit

The "VULCAN" Safety Way!

increases with the facility with which your mechanic does his work.

Danger-inviting obstructions upon tools block your manufacturing progress.

***A "Vulcan" Safety Lathe Dog* will always protect against the dangers of the old style projecting *screw*.**

***A "Vulcan" Safety Lathe Dog* will remove the "danger-sense" from your employee's mind—the "capacity-robber" from your payroll.**

***"Vulcan" Safety Lathe Dogs* will not impose *One Cent's Worth* of burden upon your shop equipment—improvements have not increased the prices.**

***"Vulcan" Safety Lathe Dogs* bid you "*Keep Step*," if you would decrease your liability insurance.**

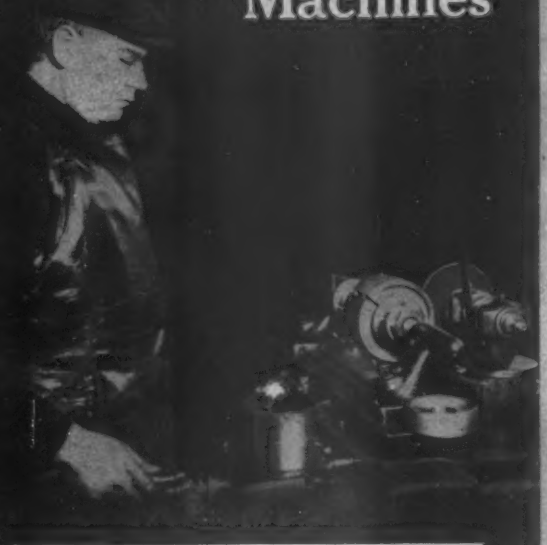
WE ARE ONLY MFRS. OF THIS SIMPLEST FORM OF LATHE DOG; DEALER WILL SERVE YOU

J. H. Williams & Co.

No. 57 Richards St., Brooklyn, N. Y.

The Old Arm-breaking Way!

Get Bigger and Better Work from the Little Grinding Machines



The Right Wheel in the Right Place will do it.

Get an Aloxite Wheel for general steel grinding—Carborundum for cast iron, brass, bronze, etc.,—in the right grit and grade—and the little grinder will show more and better results—you can extend its field of usefulness—increase its capacity.

A small machine of limited worth in an Indiana plant, since being equipped with an Aloxite Wheel, is able to turn out a splendid class of cylindrical grinding—the work is removing .020 of an inch from open-hearth steel pieces, 5½ inches in diameter, 3½ inches wide—the grinding time is 20 minutes per piece—the work is done dry—the finish excellent. Our service department is anxious to help YOU to get the *Right Wheel in the Right Place.*

The Carborundum Company

Niagara Falls, N. Y.

New York Chicago Boston
Philadelphia Pittsburgh
Cleveland Cincinnati Milwaukee
Grand Rapids London, Eng.

YOU CAN DRIVE 2-INCH HIGH SPEED DRILLS

7 inches per minute in solid cast iron, on our 26-inch Sliding Head All Geared Drill, without using the Back Gears.

It will accurately bore an 8″ cylinder.

Note the massive, rigid, powerful construction. There are no cone belts and no inherent belt to buy, to maintain, to slip, shift and give trouble.

8 Geared Speeds and 8 Geared Feeds, all under constant control from front of machine. Nothing on the market to compare with it.

This is a progressive drill for the progressive shop. Why buy a big clumsy drill press and then have to invest in a lot of expensive cone and inherent belts (which must also be maintained) when the ALL GEARED DRILL delivers equal or more power, occupies less floor space, is more easily and quickly manipulated, and is ready to run when you get it hitched to your line shaft? You need this machine. It will not only *save* money but it will *earn* money for you. Our ALL GEARED DRILLS are built in three sizes. Get details. Write us today.

BARNES DRILL CO.

Incorporated 1907

815-831 Chestnut Street, Rockford, Ill., U. S. A.

Agents for Germany and Austria: E. Sonnenthal, Jr., Berlin, C.2, Cologne and Vienna. Great Britain: C. W. Burton, Griffiths & Co., London, E. C. Belgium: G. & F. Limbourg Freres, Brussels. Ontario: Kellogg & Co., Toronto. Japan: Roku-Roku Shoten, Tokio.

SIBLEY

The Drill of Utmost Economy

20 in. COMPLETE

Note the stocky, substantial design and generous proportion of all working parts. Consider the light steel feed lever—strong enough for heavy drilling—sensitive enough for light work. Equipped with or without back gears or power feed.

Send for full information

Sibley Machine Tool Co.

NORTH TUTT ST., SOUTH BEND, IND.

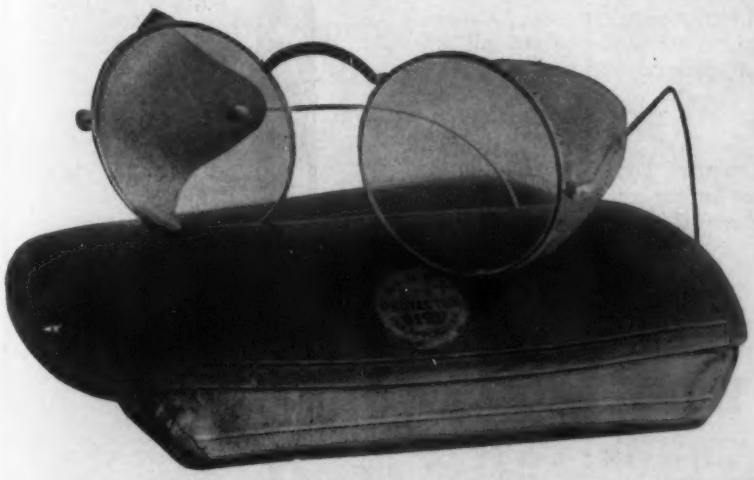
To Protect Your Workmen Use

Albex Eye Protectors

Endorsed by Employers' Liability Insurance Companies

Specially designed to protect the eyes of workmen from flying particles, irritating gases, dust and glare

¶ These eye protectors are adjustable to the face of the wearer. They are substantially made and are so constructed that they can be worn constantly without discomfort.



¶ Albex Eye Protectors are glazed with curved white, smoke and amber lenses for ordinary use. Extra thick white glass supplied where special protection is required. All lenses can be replaced when damaged.

Jobbing price, $6.75 per dozen, including substantial steel cases.

Retail price, $1.00 per pair

Order from your supply house

T. A. Willson & Co., Inc.
MANUFACTURING OPTICIANS
Established 1870 READING, PA.

SEE WHAT IT COSTS

SEE HOW IT WORKS
SEE HOW IT LASTS
SEE NUMBER PIECES GROUND

THE FIRST COST MAY SEEM HIGH BUT THE WORK PRODUCED MAY JUSTIFY YOUR PAYING IT. SUCH IS OUR EXPERIENCE.

WE MANUFACTURE HIGH GRADE

EMERY WHEELS

PITTSBURGH EMERY WHEEL CO.

GRINDING ENGINEERS

Headquarters
PITTSBURGH, PA.

Chicago—Chas. R White, Congress Hotel
Cleveland—Frank Lewis, Hippodrome Bldg.

"Detroit" Twist Drills

Trade Mark

Accuracy—High Efficiency—Length of Service—

All these you get when you use "Detroit" Twist Drills.

Accuracy

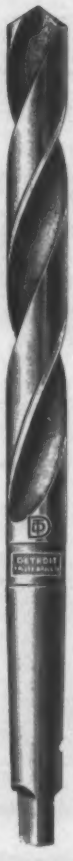
is assured because accuracy governs every process in the making from the selection of the steel to the final inspection of the finished article.

High Efficiency

is the ideal we keep constantly in mind and high-efficiency methods are in use throughout our plant. Human skill, scientific equipment, technical knowledge, 26 years' experience, repeated tests and continuous supervision, all are factors which make for high efficiency.

Length of Service

has become a by-word for "Detroit" Drills because actual use has proved that they wear longer and drill *more* holes through greater thicknesses of metal in less time than ordinary drills. We can furnish proof of what they've done for others. Ask for it.



"Detroit" Twist Drills are carried by Dealers everywhere. Order some today and make a few tests for your own satisfaction. The results will interest you.

Write today for "Catalogue E"

DETROIT TWIST DRILL COMPANY

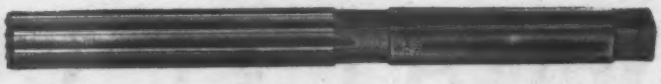
1926 Wabash Ave. CHICAGO

Improving Twist Drills Since 1886

614-626 Fort St. DETROIT

30 Church St. NEW YORK

321



The Drill is the Vital Part

The best drilling machine on the market will not earn its salt if equipped with a poor drill. The drill does the work; the machine only turns the drill.

The steel in "W & B" Drills and Reamers is the latest improved Vanadium High Speed Steel, specially tempered and hardened. It is twisted while hot. The grain is not disturbed by the use of our process. You get the drills in perfect condition with all the strength and toughness of the original bar.

Every drill or reamer stamped with the W & B trademark is guaranteed to be perfect. We brand it with the brand of quality and back it with a reputation gained in sixty years' experience in quality production.

Can be bought of all large jobbers. Supplied direct if dealer cannot fill your order.

Trade **Tools of Quality Bear These Marks** Mark

The Whitman & Barnes Mfg. Co.

Established 1854

New York Store, 64 Reade St. **General Office, Akron, O.**

Factories: Akron, O.; Chicago, Ill.; St. Catharines, Ont.

Export Sales Agent:
A. J. BARNES
90 West St., New York

European Representatives:
THEODORE BUTLER, Ltd.
149 Queen Victoria St., E. C., London, England

"I made and patented this Wrench 30 years ago

and I put my best efforts into it. Since then this wrench has reached a popularity that is phenomenal. I attribute its success to handy design, the use of high grade material, and to my personal supervision in its manufacture. It is to-day the same splendid tool I made in the beginning."

Chas. E. Billings

President

THE MARK OF QUALITY B THE BILLINGS & SPENCER CO. HARTFORD

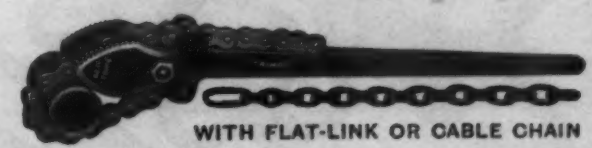
Billings & Spencer

Hartford, Conn.

The Rule of 3 is the Stepping Stone To Many a Fortune

Try Trimo Tools

TRIMO PIPE WRENCH



WITH FLAT-LINK OR CABLE CHAIN

TRIMO CHAIN WRENCH

TRIMO PIPE CUTTER

Strongest Safest Surest

Send for Catalog No. 33

MADE BY

Trimont Mfg. Company, 55 Amory St. Roxbury (Boston), Mass.

Spirals for Concrete Construction are quickly formed on a

Helix Coiling Machine

It may be adjusted for open or close wound spirals and also for various lengths.

It is a solid construction, and the extension is supported in a stand, with rolls, allowing it to revolve with the feed, and thus revolving the spiral while it is wound.

The machine is built in two sizes, the cut showing the smaller size.

We can also furnish Straighteners and Cutters for preparing the wire for the Coilers.

The F. B. Shuster Co.

Formerly JOHN ADT & SON

Established 1866 New Haven, Conn.

Automatic Wire Straighteners and Cutters for all shapes of wire. Elastic Rotary Blow Riveting Machines.

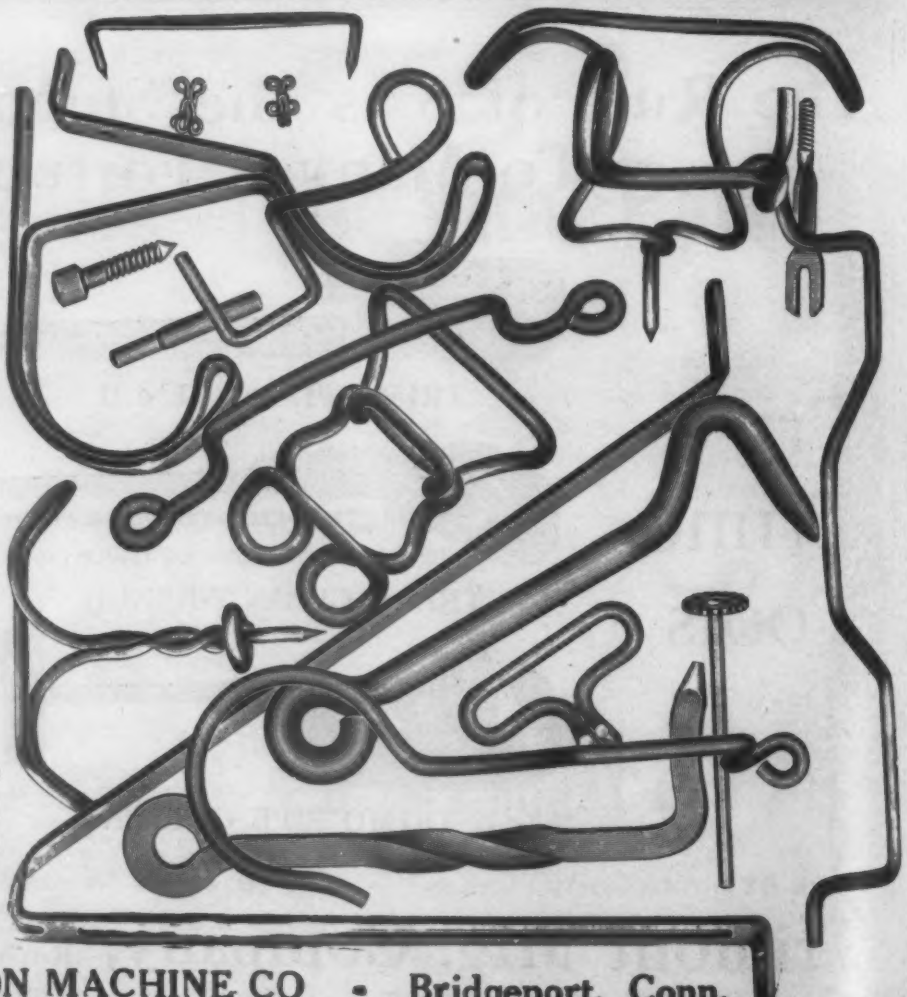
AUTOMATIC MACHINERY

of almost every description designed and built.

The cut shows a few of the many shapes and forms made by machines designed and built by us.

Send us sample. We will then let you know our price and time of delivery.

We also build Wire Straighteners, Thread Rolling and Sash Chain Machines.



The A. H. NILSON MACHINE CO - Bridgeport, Conn.

Rochester Helve Hammer

For Complete Information and Prices, Address:
The West Tire Setter Co., 244 Cutler Ave., Rochester, N. Y.

The Bêché Hammer

Hammer and Compressor Combined

Easily the most powerful and efficient forge, hammer built

Nazel Engineering and Machine Works

4045 N. 5th St.
Phila., Pa.

Sole Mfrs. for U. S. and Canada

Illustration shows 165 lb. Hammer Motor Driven

Other sizes: 66, 250, 350 500 and 770 lbs.

Belt or Motor Drive

Write for Catalogue

The Bradley Cushioned Helve Hammer

is in a class by itself. There is no other Cushioned Helve Hammer.

If your work is continuous, like plating, drawing, swaging, collaring, welding or spindle making, with infrequent changes in size of material, or

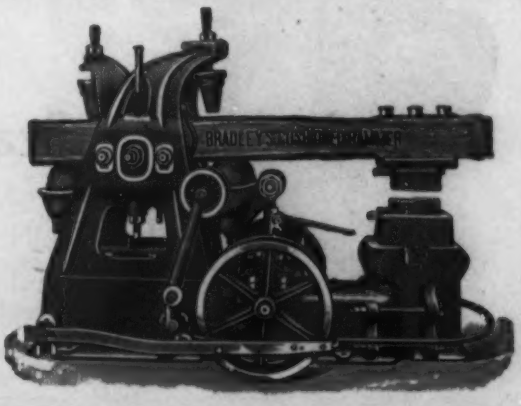
If it is die-work where perfect accuracy and the finest finish are imperative, there is no other Hammer made that can compare with it in quantity and quality of output, durability, controllability or any other feature. Made with heads weighing 15 to 200 lbs.

More Bradley Hammers are sold each year than of all other Power Hammers combined. We make four styles of Belt Hammers and a line of Heating Forges.

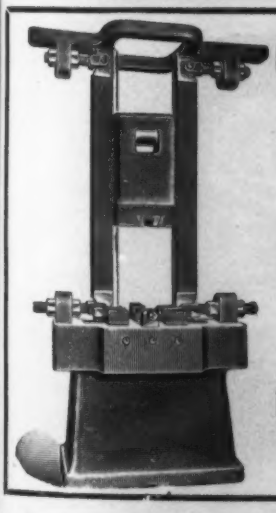
Send for Circulars.

C. C. BRADLEY & SON, Syracuse, N. Y.

FOREIGN AGENTS:—Schuchardt & Schutte, BERLIN, VIENNA, STOCKHOLM, ST. PETERSBURG, COPENHAGEN, BUDAPEST; Alfred H. Schutte, COLOGNE, BRUSSELS, LIEGE, PARIS, MILAN, BILBAO; Buck & Hickman, Whitechapel Road, LONDON.



6 Poppet Drop



with hammers from 100 to 1800 lbs., for stamping sterling flatware, toilet sets, trays and a general line of sterling silverware.

We are specialists in the drop line, and make all styles of drops to be operated by the PECK AUTOMATIC DROP LIFTER, or a lifting pulley.

Durability and economy counsel Peck drops.

Miner & Peck Mfg. Co.
Proprs. of
The Peck Drop Press Works
NEW HAVEN, CONN.

Unlike Any Other

Even the more expensive forging machines cannot equal our

Dead Stroke Power Hammers

They can be run at high speed without breaking themselves to pieces. 25-pound bracket hammer used by leading coppersmiths, gives excellent results. Have a circular?

DIENELT & EISENHARDT, Inc.
1304 Howard St., PHILA.

Inclinable Open Back Foot Press

MEETS every requirement for economically manufacturing light work. Most efficient Foot Press made.

WRITE TODAY FOR PROOF

ROCKFORD IRON WORKS
ROCKFORD, ILL.

Beaudry Champion Power Hammers

cost less than any capable of producing an equal amount of work.

They have a longer stroke, a greater capacity, and will handle a wider range of stock than any of the same rating.

They deliver a maximum blow of more than six times the weight of the ram.

Send for Catalog.

BEAUDRY & CO., Inc.
141 MILK STREET
BOSTON, MASS., U. S. A.

Standard Drop Presses
Plain and Automatic Types

Standard Presses have demonstrated their great power, economy and efficiency of operation in all classes of metal working—from fine jewelry stampings of precious metals to the heavy drawn press work of steel, copper, brass, etc.

Design, materials and construction throughout the full line of Standard Presses are the best that years of specialized Press Building Experience can suggest.

Gross production ability, with accuracy and fineness of finish, are features which are built right into every Standard Press.

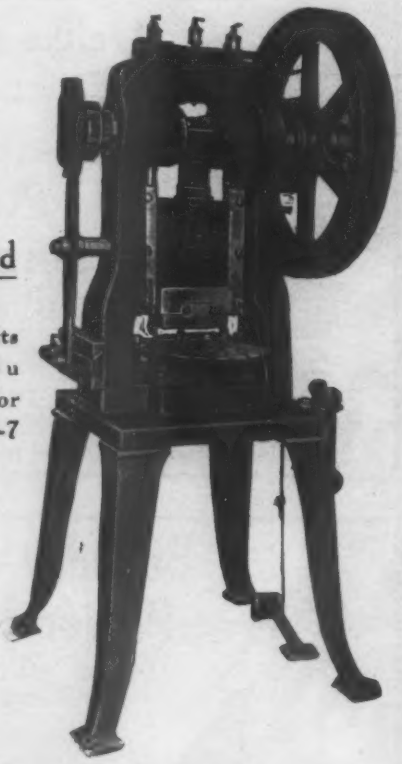
Let us submit data on presses to meet your particular requirements whether you need special or standard models. Write.

Standard Machinery Co.
Providence, R. I.

Manufacturers of Single and Double Acting Power Presses, Reducing and Drawing Presses, Foot Presses, Screw Presses, Plain and Automatic Drop Hammers, Rolling Mills, Wire Flattening Mills, Grading Mills, Draw Benches, Wire Coilers, Rotary Swaging Machines, Rotary Shears, Miscellaneous Machinery, Ball and Roller Bearings, Dies, Tools and Forgings.

This Ratchet Dial Press is Unparalleled

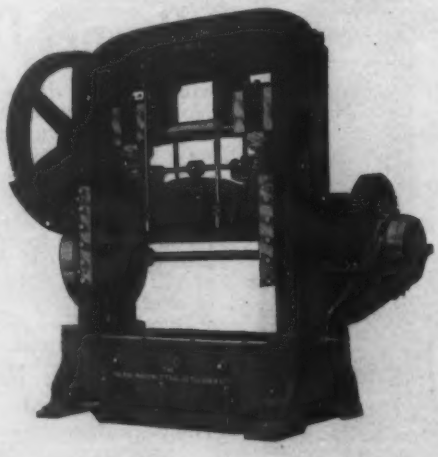
To appreciate its possibilities you should write for our Catalogue B-7



Be a progressive and investigate

This and a hundred other designs built by

The E. J. Manville Machine Co.
WATERBURY, CONN.



The Advantages of "TOLEDO"

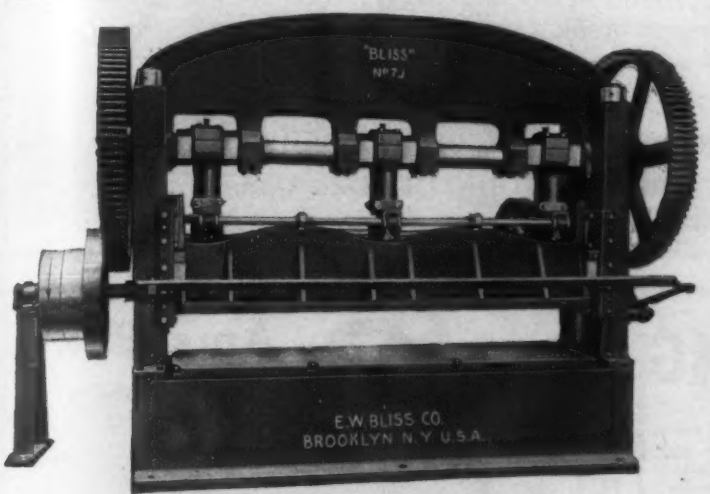
Presses—Shears—Hammers and Dies are so pronounced as to leave no doubt of their **Practical Efficiency.**

No. 95E is fitted with long stroke, high die space, self-contained drawing attachment, new form knockout in slide and friction clutch so attached as to eliminate outboard bearing.

The Toledo Machine & Tool Co.
Toledo, O., U. S. A.

Bliss Double and Triple Crank Presses

Economical in Operation, Simple in Construction and Control



No. 7-J Triple-Crank Press. Weight 60,000 lbs.

Catalogue 8D on request.

They combine a massive, powerful construction and rigidity that minimizes the maintenance cost of both machines and tools.

The metal in the frames is so distributed as to give the greatest possible strength for a machine of a given weight. Pitmans and Pitman Screws are of large diameters. Locking device on Pitmans requires no caps. Pitman screws have a special thread adapted for taking a heavy thrust without producing a spreading strain on the pitman.

Send for further details, stating requirements.

Over 150 Sizes and Styles

E. W. BLISS CO., 11 Adams Street Brooklyn, N. Y., U. S. A.

Representatives for Chicago and vicinity: Stiles-Morse Co., 562 Washington Blvd., Chicago, Ill.

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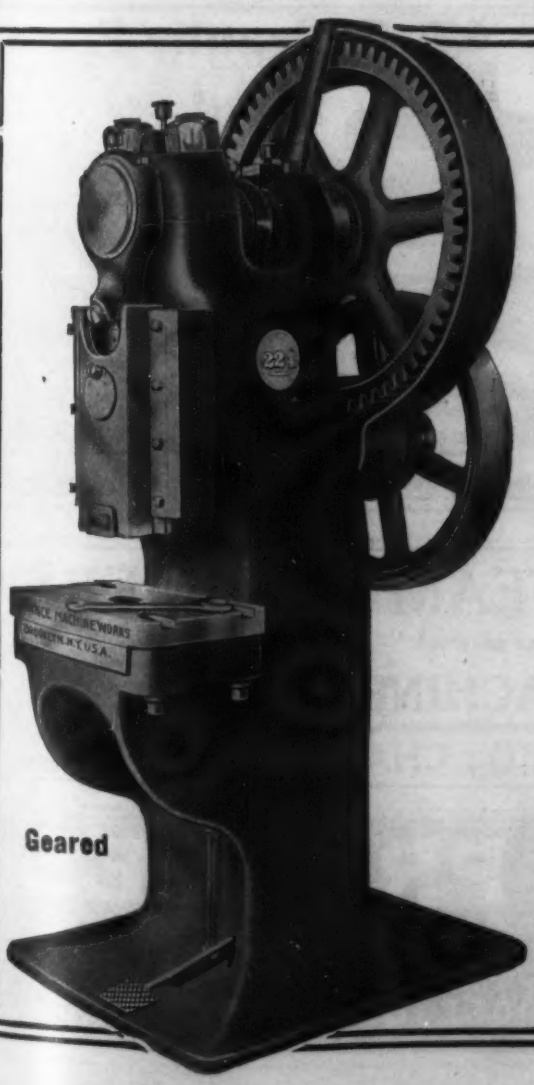
BLISS



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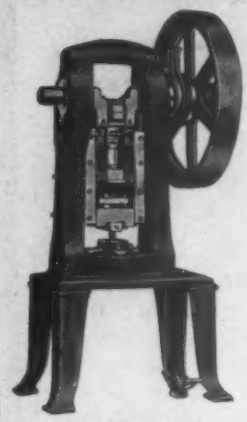

Bolt Head Trimming Press (2039).

Bolt Head Trimming Presses

These presses are used for trimming operations on bolts made by the cold process. The blanks as taken from a cold heading machine, with round heads, can be trimmed in these presses, giving the trimmed blank a square or hexagon head, as desired.

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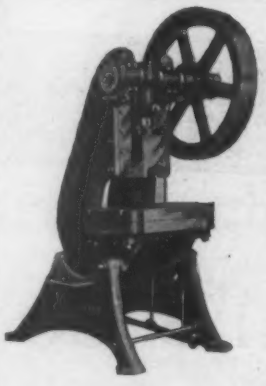

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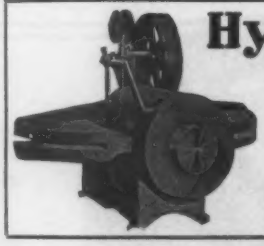

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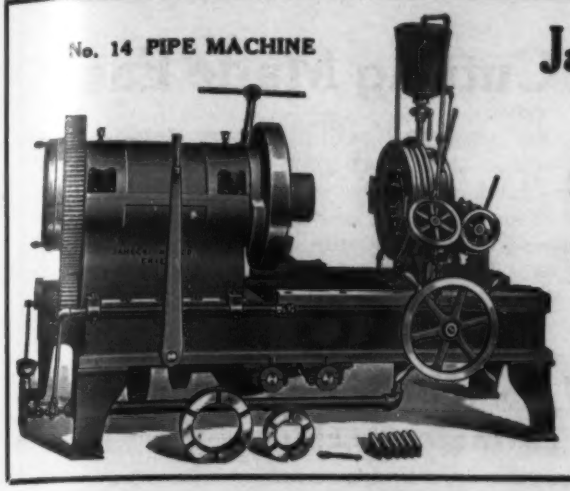

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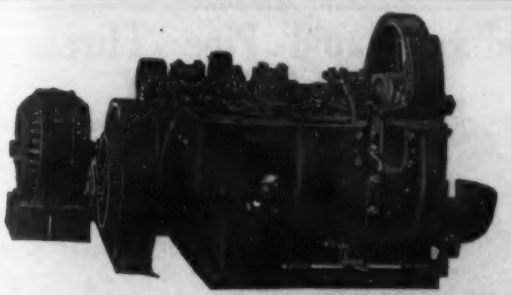

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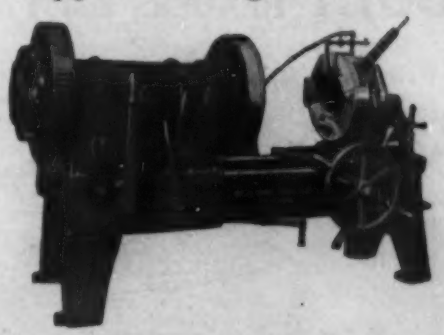

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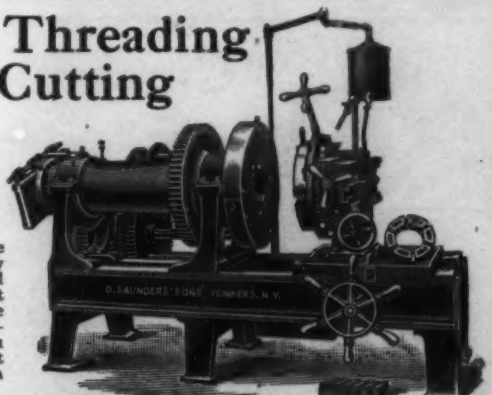

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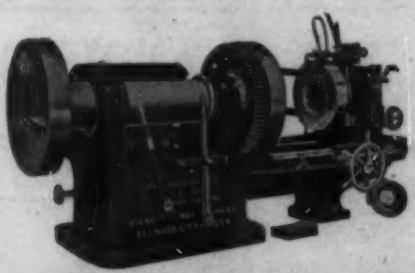

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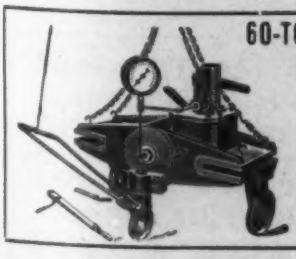

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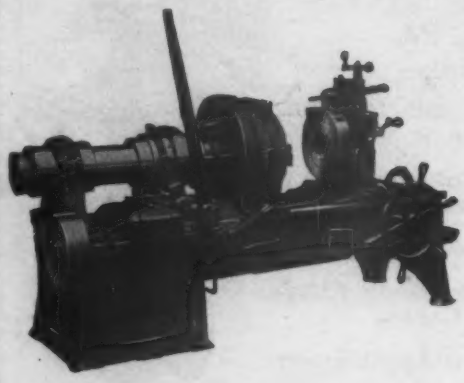

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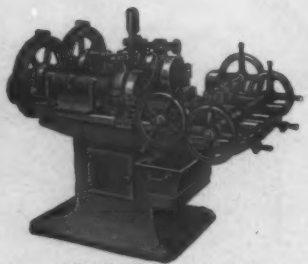

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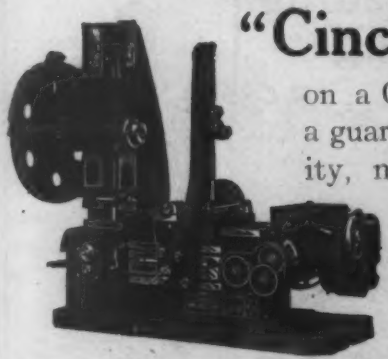

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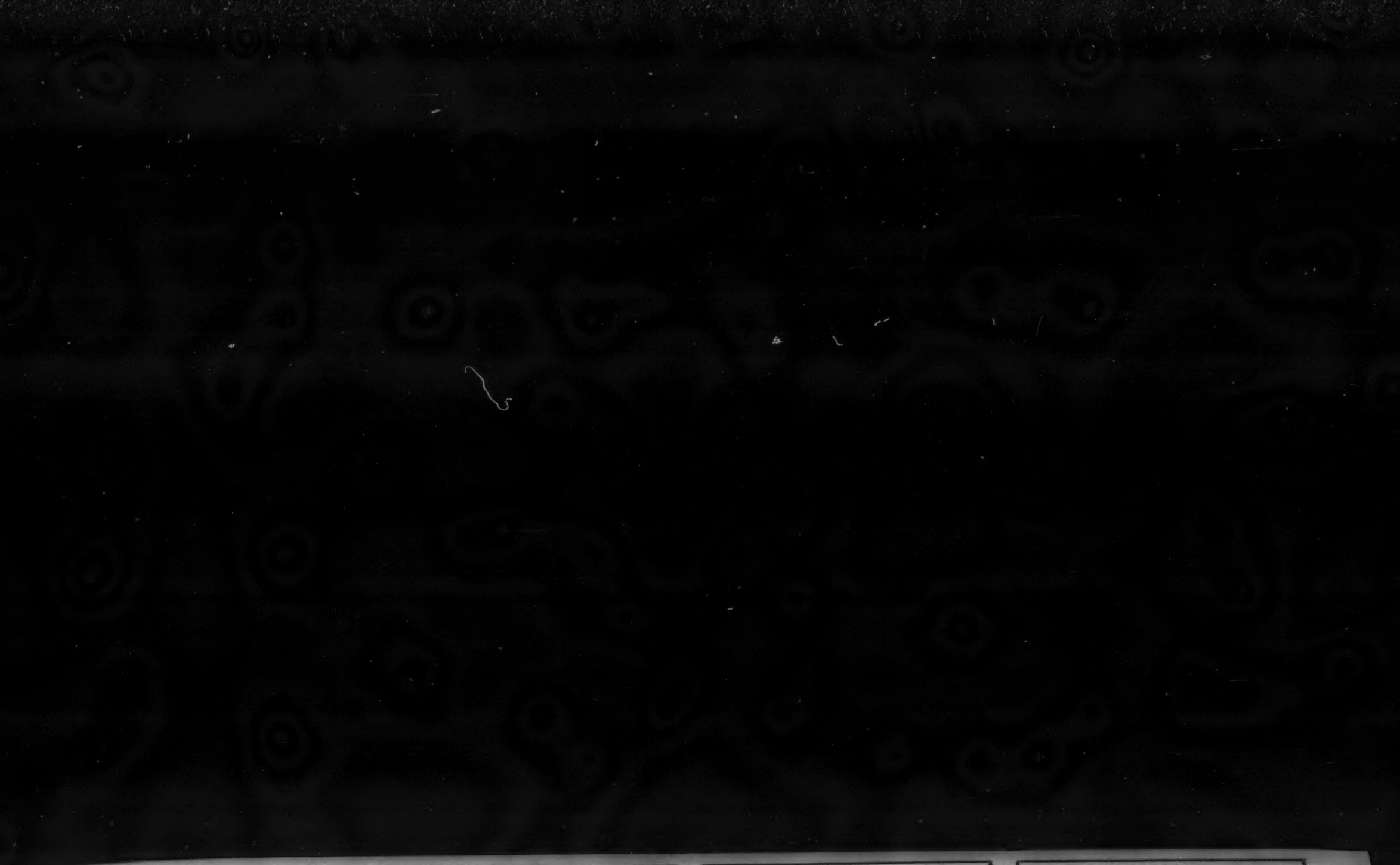
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